

**NEW GENERA AND SPECIES OF CONIFER-INHABITING  
PHYLINE PLANT BUGS FROM NORTH AMERICA  
(HETEROPTERA: MIRIDAE)**

MICHAEL D. SCHWARTZ<sup>1</sup> AND RANDALL T. SCHUH<sup>2</sup>

<sup>1</sup>Research Associate, Department of Entomology, American Museum of Natural History; % Biological Resources Program, Centre for Land and Biological Resources Research, Agriculture and Agri-Food Canada, Ottawa, Ontario K1A 0C6

<sup>2</sup>George Willett Curator of Entomology, Division of Invertebrate Zoology, American Museum of Natural History, Central Park West at 79th Street, New York, New York 10024-5192

*Abstract.*—Three new genera of phyline Miridae are described from North America to accommodate two taxa removed from *Plagiognathus* and five newly recognized species from the western part of the continent. *Coniferocoris*, new genus comprises the type species *C. pinicolus* and two additional new species, *C. abiesicolus*, and *C. polhemi*; *Piceophylus*, new genus comprises the type species *P. keltoni*, new species; and *Pinophylus*, new genus comprises the type species *Plagiognathus rolfsi* Knight, *Plagiognathus carneolus* Knight, and the new species *Pinophylus stonedahli*. Two new species are placed in *Psallovirus* Henry: *P. nigroantennatus* and *P. dimorphicus*, and new distributional and host records for *P. flaviclavus* (Knight) are given. The male genitalic structures of all species are illustrated, and scanning electron micrographs are presented for the head, dorsal vestiture, and pretarsus of representative species. Habitus views as photographs or illustrations are provided for all species.

---

The conifer-feeding Miridae have been the subject of a number of revisionary works, as for example the mirine genera *Platylygus* (Kelton and Knight, 1970), *Pinalitus* (Kelton, 1977), and *Dichrooscytus* (Kelton, 1972). Stonedahl and Schwartz (1996) described two new genera of conifer-feeding Phylinae and Stonedahl (1990) revised *Atractotomus*, some of whose members are conifer feeders. Nonetheless, the taxonomy of conifer-feeding Phylinae in general remains inadequately studied and several species remain undescribed. In the present paper we recognize additional monophyletic groups of conifer-feeding North American Phylinae and document the species diversity, host associations, and distributions of those groups.

The species included in this paper have come to light in part through the ongoing work of the junior author on *Plagiognathus* Fieber and the recently published work of Stonedahl (1990) on *Atractotomus* Fieber. Although in the final analysis we were able to assemble a reasonable sample of specimens, this was made possible only through the sorting of large amounts of material from existing collections and through our own extensive field work in the western United States. None of the taxa described here are common in collections, and in particular, the small, somber-colored species of *Coniferocoris* are inconspicuous when mixed in with large numbers of similarly sized and colored specimens of *Plagiognathus*.

The three new genera described below share certain attributes that may suggest a close relationship among them. First is the conspicuous sexual dimorphism, most

particularly in antennal segment 2, which in the male is cylindrical and of conspicuously larger diameter than in the female. Similar dimorphism is found in all species of *Campylomma* Reuter and *Rhinacloa* Reuter and in some species of *Atractotomus*, among other genera, but on the basis of other attributes, these groups seem to share little in common with the conifer feeders described in this paper.

Second, and possibly more important, is the form of the head, wherein the males in particular have the posterior margin of the eyes weakly to conspicuously removed from the anterior margin of the pronotum and distinctly transverse in appearance. In the females of some species the eyes are not so strongly removed from the pronotum as in the males, and the head is more strongly produced anteriorly, with the consequent loss of the transverse aspect found in the males.

In spite of these and other similarities, the male genitalia show substantial variation and on that basis we have chosen to assign the species to three distinct genera.

We dedicate this work to our long-time friend and colleague John T. Polhemus, in recognition of his substantial contributions to our knowledge of the Heteroptera. John has devoted much of his life to the study of Heteroptera, particularly the aquatic and semiaquatic families. His tireless efforts in the field have produced, in addition to aquatic bugs, large numbers of specimens of Miridae, some of them belonging to the taxa discussed herein. It is with great pleasure that we name one of the new species in John's honor.

All measurements are given in millimeters. When available, five specimens of each sex were measured with the mean and range reported for each species. The authors of the host plants recorded follow the nomenclature of Fernald (1950) or Munz and Keck (1970).

### **Coniferocoris**, new genus

Figs. 1–6

**Type species.** *Coniferocoris pinicolus* Schwartz and Schuh, new species.

**Diagnosis.** Recognized among other Phylini by the following suite of characters: small body, coloration ranging from tan to nearly black, sometimes with pale markings; evenly distributed, moderate length, reclining, black or brown simple setae on dorsum; prominent or short anteocular portion of head; antennal segment 2 cylindrical and of greater diameter in males than females; labium reaching from apex of hind coxa to middle of the abdominal sternum; pretarsus with claw relatively broad basally, slender distally, pulvillus small, parempodia setiform and short (Figs. 5D, 6E); vesica J-shaped, with two, very short apical spines (Fig. 2A, B, F), secondary gonopore only slightly removed from apex and moderately large; and left paramere with relatively long, narrow anterior lobe (Fig. 2C).

*Coniferocoris* can be distinguished from other small, conifer-inhabiting western Phylini by the presence of simple, short, dark, dorsal setae (Figs. 5C, 6D). The dorsal vestiture of *Atractotomus*, *Knightmiroides* Stonedal and Schwartz, *Phoenicocoris* Reuter, and *Pinomiris* Stonedahl and Schwartz species includes either silvery white, silky setae or white, flattened scale-like setae; small, conifer-feeding *Plagiognathus* species have obviously longer and more densely distributed dorsal setae than *Conifericoris* spp. The structure of the vesica will separate *Conifericoris* from other



Fig. 1. Dorsal habitus photograph of *Coniferocoris abiesicolus* Schwartz and Schuh, female.

phyline genera, and the sexually dimorphic second antennal segment will easily distinguish its species from the males of *Plagiognathus*.

**Description.** Male. *Head*: frons strongly declivent or gently sloping (Figs. 5A, 6A); clypeus either strongly produced or small, barely visible in dorsal view (Fig. 3C); sometimes frons with faint transverse striations; posterior margin straight; vertex slightly convex, basal carina obsolete; mandibular and maxillary plates not produced, maxillary plate slightly sunken, gena and gula small; buccal cavity large, ovoid; eyes large, subequal to head height in lateral view, dorsal margin produced dorsal to vertex, posterolateral margin slightly but distinctly removed from anterolateral margin of pronotum, emarginate anteriorly; antennal insertion subcontiguous or contiguous with anterior margin of eye, slightly dorsal to ventral margin of eye; antennal segment 1 not thickened, short, segment 2 linear, thickened, of uniform diameter (Fig. 4), length greater than width of head across eyes; segments 3 and 4 of much smaller diameter than segments 1 and 2; reaching from apex of hind coxa to abdominal sternum 6. *Thorax*: pronotum trapeziform, as wide as long, lateral margins nearly straight, posterior margin slightly concave; disk flattened, without distinct anterior and posterior lobes; calli slightly convex, sometimes subconfluent medially; mesoscutum broadly exposed; scutellum slightly convex; thoracic pleura subglabrous; metathoracic scent-gland evaporatory area as in Fig. 6C. *Hemelytra*: moderately elongate, subparallel-sided; cuneus shorter than width of head across eyes, longer, than broad, slightly deflexed, apex just exceeding apex of genital segment, in lateral

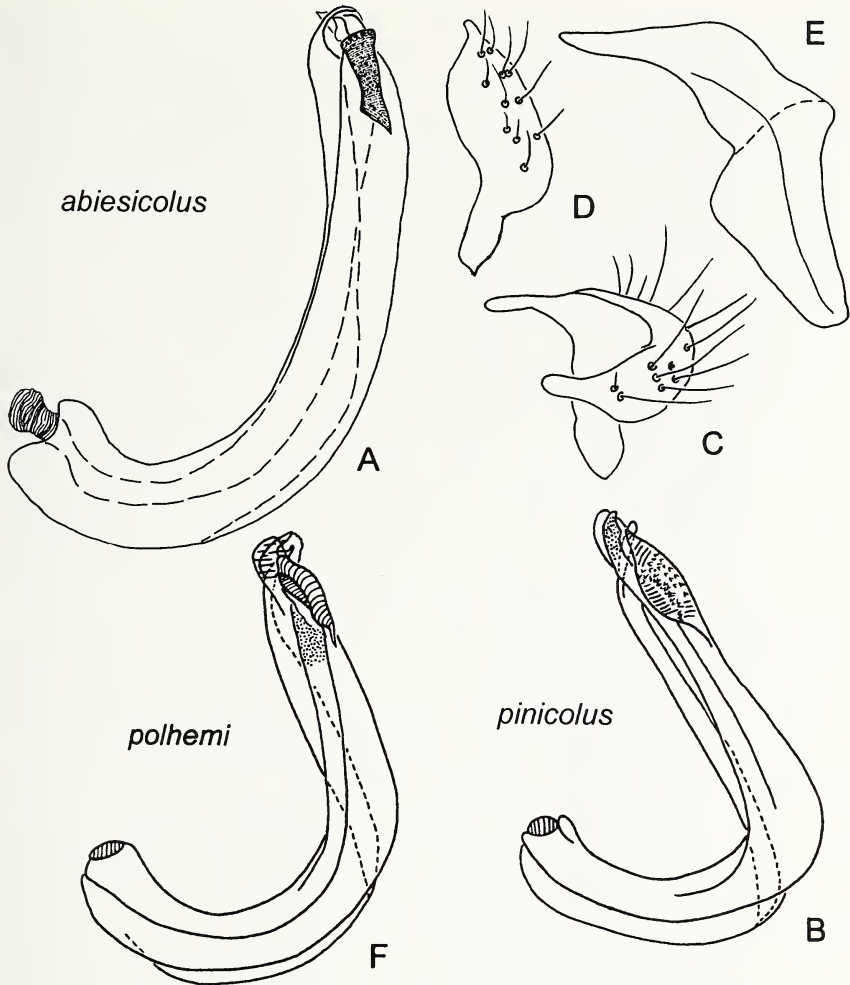


Fig. 2. Male genitalia of *Coniferocoris* spp. A. *C. abiesicolus* Schwartz and Schuh, vesica. B–E. *C. pinicolus* Schwartz and Schuh. B. Vesica. C. Left paramere. D. Right paramere. E. Phallosome. F. *C. polhemi* Schwartz and Schuh, vesica.

view. *Venter*: evenly covered with reclining simple setae. *Legs*: tibiae without dark spots at bases of tibial spines; tibial spines either black or pale brown. *Male genitalia*: Genital capsule: conical, apex gently rounded; ventral medial surface of genital segment with many short simple setae, without carina or keel. Left paramere (Fig. 2C): small, anterior lobe long, length subequal to posterior lobe, posterior lobe gently attenuate and slightly recurved. Right paramere (Fig. 2D): subovoid attenuate apically. Phallosome (Fig. 2E): relatively short, with slot-like aperture. Vesica (Figs. 2A, B, F): J-shaped, of roughly equal thickness throughout; vesical straps terminating

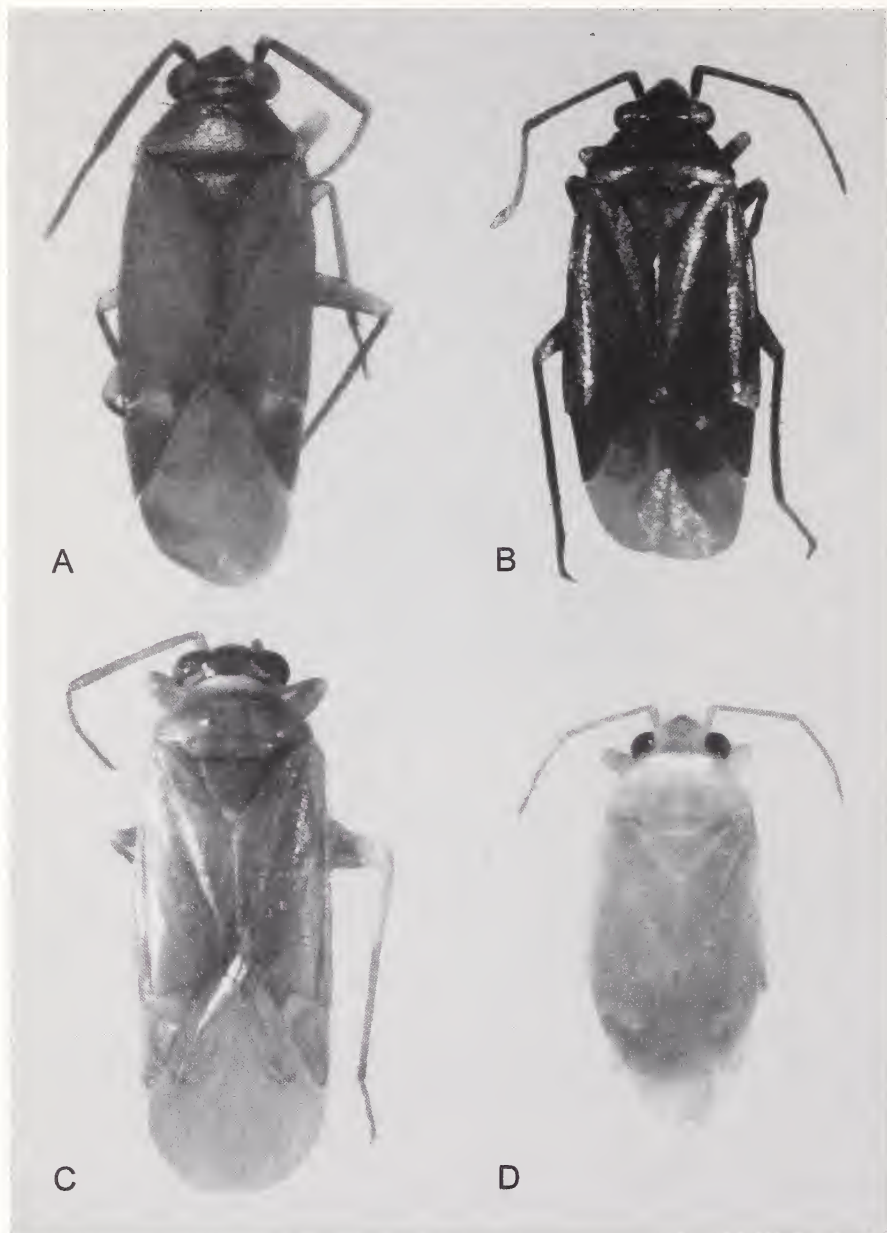


Fig. 3. Dorsal habitus photographs of *Coniferocoris* spp. A, B. *C. pinicolus* Schwartz and Schuh. A. Male. B. Female. C, D. *C. polhemi* Schwartz and Schuh. C. Male. D. Female.

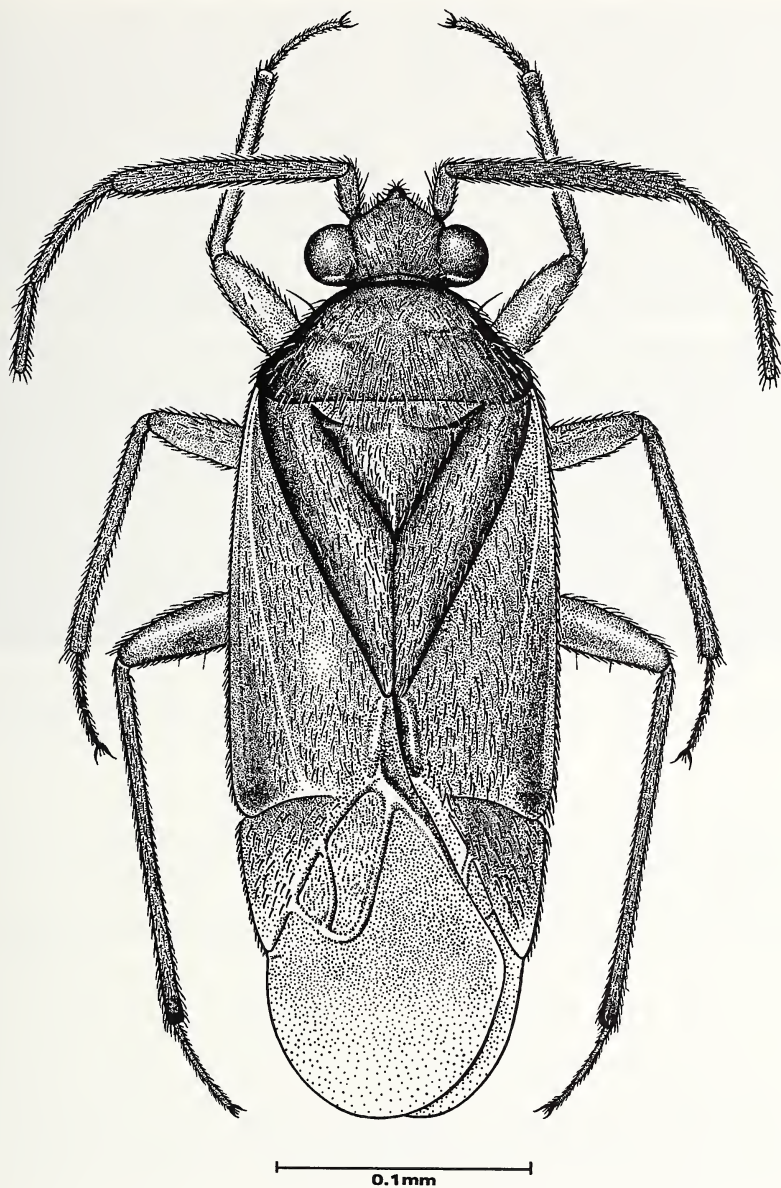


Fig. 4. Dorsal habitus illustration of *Coniferocoris pinicolus* Schwartz and Schuh.

with pointed or slightly recurved apices; well-sclerotized secondary gonopore situated subapically.

Female (Figs. 3B, D, 5B, 6B). Similar to male except body much more strongly

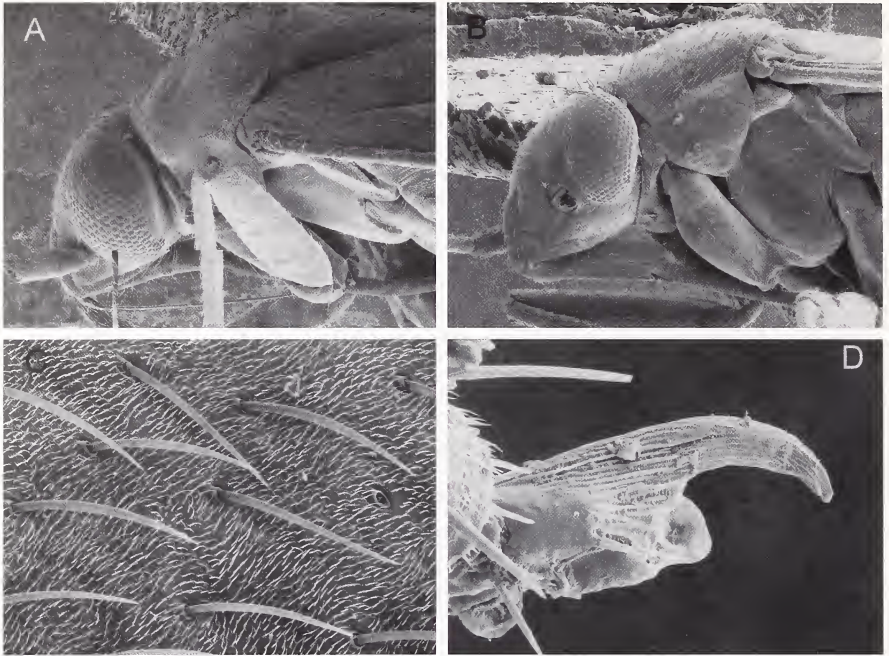


Fig. 5. Photomicrographs of *Coniferoecoris pinicolus* Schwartz and Schuh. A. Head and propleuron, lateral view, male. B. Head and propleuron, lateral view, female. C. Dorsal setae. D. Pretarsus, lateral view.

ovoid, eyes smaller, antecular portion of head more strongly produced, vertex wider, and antennal segment 2 much more slender than in male.

**Etymology.** Named for the apparent strict association of the all known species with coniferous trees; masculine.

**Discussion.** Three species occur in western cordilleran North America and breed on conifers.

KEY TO SPECIES OF *CONIFEROECORIS*

- 1. Pronotum pale yellowish orange to pale brown . . . . . *polhemi* n.sp.
- Pronotum castaneous, dark brown, or black . . . . . 2
- 2. Pronotum castaneous and hemelytra reddish brown; antennae pale . . . . . *abiesicolus* n.sp.
- Pronotum and hemelytra concolorous dark brown to black, with only base of cuneus faintly pale; antennae dark . . . . . *pinicolus* n.sp.

***Coniferoecoris abiesicolus*, new species**  
Figs. 1, 2A

**Diagnosis.** Recognized by the deeply castaneous head (Fig. 1), labial segment 1, thorax, mesoscutum, scutellum, bases of coxae, and venter, reddish brown hemelytra, and pale yellow antennal segments 1 and 2 and legs; vestiture of golden simple setae, labium just surpassing hind coxa; and large vesica. Distinguished from *C.*

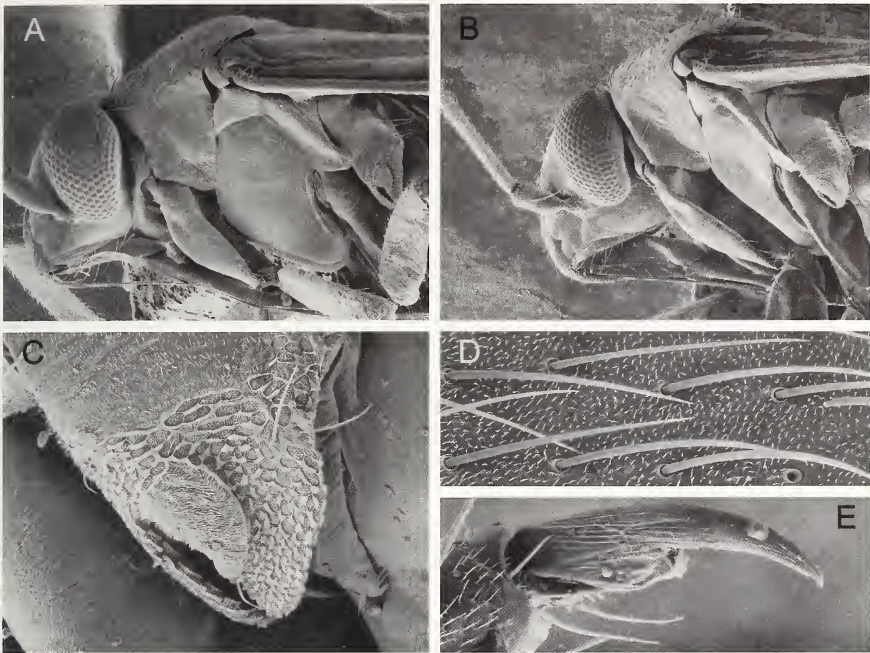


Fig. 6. Photomicrographs of *Coniferocoris polhemi* Schwartz and Schuh. A. Head and propleuron, lateral view, male. B. Head and propleuron, lateral view, female. C. Ostiolar peritreme. D. Dorsal setae. E. Pretarsus, lateral view.

*pinicolus* by the pale antennae and from *C. polhemi* by the red to castaneous coloration of the dorsum. The dorsal vestiture of *C. abiesicolus* is also slightly longer and less neatly arranged than in its congeners.

**Description.** Male. Total length 3.2 (3.1–3.3); head and thorax shining black, hemelytra reddish brown, antennae and legs pale yellow; dorsum with evenly distributed, moderate length, recurved, fine, golden, simple setae. *Head*: anteocular portion moderately short; castaneous; width 0.74 (0.73–0.74); vertex width 0.30; eyes large; antennae pale yellow; antennal segments 3 and 4 sometimes slightly darkened; antennal measurements 0.21: 0.84 (0.80–0.88): 0.46 (0.43–0.48): 0.33; labium exceeding apex of hind coxa, length 1.44 (1.43–1.45), yellow, segments 1 and 4 darkened. *Thorax*: propleura, mesoscutum, scutellum, and peritremal disk castaneous; sometimes calli black. *Hemelytra*: reddish brown, base of cuneus hyaline; membrane pale, veins infusate. *Venter*: castaneous. *Legs*: pale yellow; bases of middle and hind coxae castaneous; tibial spines dark brown; tarsi sometimes dusky brown. *Genitalia*: see Fig. 2A.

*Female*. Total length 3.1 (2.9–3.2); head width 0.73 (0.69–0.76); vertex width 0.35 (0.34–0.36); antennal measurements 0.21 (0.20–0.23): 0.73 (0.68–0.79): 0.48 (0.44–0.50): 0.34 (0.33–0.34); labium reaching base of ovipositor, length 1.48 (1.43–1.55).

**Etymology.** Named for the host genus.



**Hosts.** Taken on white fir, *Abies concolor* (Gord. & Glend.) Lindl. and subalpine fir, *A. lasiocarpa* (Hook.) Nutt.

**Distribution.** Known from Wheeler Peak, Nevada, and Vail, Colorado.

**Discussion.** This species is known from only a limited number of specimens from disjunct localities in eastern Nevada and central Colorado. It will probably prove to be more widely distributed in the central Rockies, but such knowledge will only become available with additional collecting on *Abies* spp. at mid to high altitudes. *Coniferocoris abiesicolus* appears to breed exclusively on *Abies* spp., whereas *C. pinicolus* and *C. polhemi* seem to be restricted to *Pinus* spp. This is the most colorful of the *Coniferocoris* spp.

**Holotype.** ♂, "USA, Nevada, White Pine Co., Wheeler Peak Rd. W of Baker, Humboldt Nat. For.; 2,609 m, July 14, 1980, R.T. Schuh, G.M. Stonedahl; ex *Abies lasiocarpa* (Pinaceae)." Deposited in the American Museum of Natural History, New York.

**Paratypes.** USA, Nevada: *White Pine Co.*, Wheeler Peak Drive, elev. 7,000–10,000 ft, 6.viii.1982, M.D. Schwartz, ex *Abies concolor*, 1 ♂, 4 ♀ (AMNH and CNC). Additional specimens: USA, Colorado: *Eagle Co.*, Vail, 20.vi.1982, J.T. Polhemus, ex *Abies* sp., 2 ♀ (JTPC).

### *Coniferocoris pinicolus*, new species

Figs. 2B–E, 3A, B, 4, 5

**Diagnosis.** Recognized by the uniformly brown to black dorsum, antennae, legs, tibial spines, and labium; vestiture of black simple setae; and labium long, reaching middle of abdomen. Easily distinguished from *C. abiesicolus* and *C. polhemi* by the dark antennae and tibiae.

**Description.** Male (Figs. 3A, 4). Total length 3.2 (3.0–3.3); weakly shining, uniformly brown to black with base of cuneus faintly pale; dorsum with evenly distributed, moderate length, reclining, fine, black simple setae. *Head:* anteocular portion long (Fig. 5A); reddish brown to black, including vertex; mandibular plate sometimes castaneous; width 0.68 (0.66–0.71); vertex width 0.31 (0.29–0.32); antennae brown to black; antennal measurements 0.21 (0.20–0.23): 0.83 (0.71–0.93): 0.46 (0.43–0.50): 0.46 (0.44–0.50); labium brown to black, reaching from sternite 4 to 6, length 1.54 (1.50–1.60). *Thorax:* propleura, mesoscutum, scutellum, and peritremal disk reddish brown to black. *Hemelytra:* membrane and veins infuscate. *Venter:* brown to black. *Legs:* brownish black; femora sometimes pale yellow; apices of coxae slightly pale, tibial spines black. *Genitalia:* see Figs. 2B–E.

*Female* (Fig. 3B). Total length 3.0 (2.8–3.2); head width 0.67 (0.63–0.71); vertex width 0.35 (0.33–0.37); antennal measurements 0.19 (0.18–0.21): 0.73 (0.66–0.83): 0.43 (0.43–0.48): 0.35 (0.34–0.36); labium reaching abdominal sternum 7, length 1.69 (1.55–1.79).

**Etymology.** Named for the host genus.

**Discussion.** The secondary gonopore of *C. pinicolus* is longer in the longitudinal plane of the vesica than that of *C. polhemi*. Specimens of *C. pinicolus* collected on *Pinus sabiniana* in central California differ from specimens collected on *P. contorta* in the more northern part of the range by having the distance between the blunt apex and the closest recurved apex of the vesica longer and the color of the femora paler.

**Hosts.** Taken commonly on lodgepole pine, *P. contorta* Dougl. ex Loud. (and var.

*murrayana* (Grev. & Balf.) Engelm.), but also known from digger pine, *P. sabiniana* Dougl., and much less commonly yellow pine, *P. ponderosa* Dougl. ex P. & C. Lawson.

**Distribution.** Southern Okanagan Valley of British Columbia south through coastal Washington and Oregon to the southern Sierra Nevada Mountains of California.

**Holotype.** ♂, "USA, Washington, Pacific Co., Nahcotta June 14, 1979 R.T. Schuh ex *Pinus contorta*." Deposited in the American Museum of Natural History, New York.

**Paratypes.** CANADA, **British Columbia:** Rock Crk, 7.vi.1959, L.A. Kelton, 1 ♀ (CNC). USA, **California:** *Contra Costa Co.:* Mt Diablo, 22.iv.1933, R.L. Usinger, 1 ♀ (UCB). Russelman Park: 20.iv.1931, R.L. Usinger, 4 ♀ (UCB); 6.v.1957, H. Ruckes, ex *P. sabiniana*, 1 ♀ (UCB); 18.iii.1959, J. Powell, ex *P. sabiniana*, 3 ♀ (UCB). *Del Norte Co.,* Crescent City, 25.vi.1968, R.P. Allen, 1 ♀ (CAFA). *Fresno Co.,* Huntington Lake, 4.vii.1919, F.E. Blaisdell, 1 ♀ (CAS). *Humboldt Co.:* Samoa: 6.vi.1937, B.P. Bliven, 1 ♂, 4 ♀ (CAS); 31.v.1937, B.P. Bliven, 4 ♂, 5 ♀ (CAS). *Lake Co.,* Middletown, 14.iv.1964, C.W. O'Brien, ex *P. sabiniana*, 1 ♀ (UCB). *Madera Co.,* Beasore Meadows, 23.vii.1946, R.L. Usinger, ex *P. murrayana*, 1 ♀ (UCB). *Mariposa Co.,* Yosemite Nat. Park, Yosemite Crk Ranger Station, 21.vii.1946, R.L. Usinger, ex *P. murrayana*, 3 ♀ (UCB). *Monterey Co.,* Carmel, 21.iii.1940, R.L. Usinger, 1 ♂, 6 ♀ (UCB). *Plumas Co.,* Chester, 18.vi.1959, L.A. Kelton and R. Madge, ex *P. contorta*, 45 ♂, 21 ♀ (CNC). *San Luis Obispo Co.,* Cambria, 2.iv.1960, Gertsch and Schrammel, 1 ♀ (AMNH). *Tehama Co.,* 12 mi E of Mineral on Highway 36, 4,840 ft, 10.vii.1980, G.M. Stonedahl, ex *P. ponderosa*, 2 ♂, 7 ♀ (AMNH); Childs Meadows, 16.vi.1959, L.A. Kelton and R. Madge, 6 ♂, 11 ♀ (CNC); 12 mi E of Mineral on Highway 36, 1,513 m, 10.vii.1980, R.T. Schuh, ex *P. contorta*, 1 ♂, 1 ♀ (AMNH). *Tulare Co.:* 5.7 mi N of Kernville, Hospital Flat Cmpgrd, 28.vi.1978, J.D. Pinto, ex *P. sabiniana*, 5 ♂, 1 ♀ (UCR); Hospital Flat Cmpgrd, 5.7 mi N of Kernville, 28.iv.1978, J.D. Pinto, ex *P. sabiniana*, 1 ♂ (UCR). **Nevada:** *White Pine Co.,* Wheeler Peak Rd, W of Baker, Humboldt Nat. For., 2,688 m, 14.vii.1980, R.T. Schuh and G.M. Stonedahl, ex *P. flexilis*, 2 ♂ (AMNH). **Oregon:** *Clackamas Co.:* 1 mi S of Government Camp, 25.vii.1966, W. Gagne and J. Haddock, ex *P. contorta*, 3 ♂, 26 ♀ (UCB); Government Camp, 25.vii.1966, W. Gagné, J. Haddock, 1 ♂ (UCB). *Crook Co.,* R19E T13S Sec 3, 22.vi.1979, G. Stonedahl, ex *Senecio* sp., 7 ♀ (AMNH). *Deschutes Co.,* T21S R15E Sec 17, 21.vi.1979, G.M. Cooper, ex *P. contorta*, 1 ♂ (OSU). *Douglas Co.,* S. Windy Cove State Park, 30.v.1979, M.D. Schwartz, ex grasses under *Pinus* sp., 1 ♀ (AMNH). *Klamath Co.:* 19 mi SE of Lapine on Highway 31, 4,750 ft, 6.vi.1979, J.D. Lattin, ex *P. contorta*, 1 ♀ (OSU); Crescent Lake Junction, 25.vi.1979, R.T. Schuh, ex *P. contorta*, 1 ♂ (AMNH); Rt 97 at Crescent Lake Junction, 1,530 m, 25.vi.1979, R.T. Schuh, ex *P. contorta*, 10 ♂, 4 ♀ (AMNH). *Lincoln Co.,* South Beach State Park, 29.vi.1994, M.D. Schwartz, ex *P. contorta*, 12 ♀ (CNC). **Washington:** *Clallam Co.,* Deer Park, 5000 ft, 18.vii.1978, J. Schuh, 1 ♀ (AMNH). *Pacific Co.,* Nahcotta, 14.vi.1979, R.T. Schuh, ex *P. contorta*, 8 ♂, 46 ♀ (AMNH).

### ***Coniferocoris polhemi*, new species**

Figs. 2F, 3C, D, 6

*Microphylellus adustus*: Polhemus, 1994:130 (misidentification).

**Diagnosis.** Recognized by the generally tan to orange brown dorsum with pale yellow

low anterior of calli; brown head, antennal segments 3 and 4, tibial spines, tarsi, and genital segment submesially; vestiture of brown simple setae; labium reaching apex of hind coxa; and vesica with a narrow recurved apex and a relatively short secondary gonopore. Distinguished from *C. pinicolus* by the pale antennae and from *C. abiesicolus* by the tan rather than reddish brown coloration of the dorsum.

Two other pale colored conifer-inhabiting Phylini, *Knightomiroides ponderosae* Stonedahl and Schwartz and *K. nigrovirgatus* (Knight), could be confused with *C. polhemi* on the basis of size and general appearance. However the *Knightomiroides* spp. have the dorsum covered with moderately flattened silvery setae and the clypeus is shining castaneous and strongly contrasting with the surrounding coloration of the face, unlike the nearly unicolorous face and vertex of *C. polhemi*.

**Description.** Male (Fig. 3C). Total length 3.4 (3.1-3.6); dorsum pale yellowish orange brown with evenly distributed, moderate length, reclining, fine, brown, simple setae. *Head:* anteocular portion short (Fig. 6A); dorsal aspect, clypeus, and labrum brown; width 0.71 (0.68-0.76); vertex width 0.29 (0.28-0.30); antennae yellowish brown, segments 3 and 4 brown; segment 2 uniformly thickened; antennal measurements 0.20 (0.19-0.21): 0.88 (0.82-0.90): 0.50 (0.45-0.53): 0.32 (0.30-0.33); labium pale yellow, reaching apex of hind coxa, length 1.24 (1.20-1.25). *Thorax:* dorsum yellowish orange brown, anterior to calli, basalar plate, and epimeron pale yellow; peritremal disk pale. *Hemelytra:* weakly shining yellowish orange brown; membrane slightly infuscate; veins pale yellow. *Venter:* yellowish brown, genital segment with brown mark mesiolaterally. *Legs:* pale yellowish brown; tarsi brown; tibial spines pale brown. *Genitalia:* see Fig. 2F.

*Female* (Fig. 3D). Total length 2.8 (2.7-3.0); head width 0.68 (0.66-0.72); vertex width 0.33 (0.32-0.35); antennal measurements 0.18 (0.18-0.19): 0.63 (0.63-0.68): 0.43 (0.40-0.44): 0.30 (0.28-0.33); labium reaching apex of hind coxa, length 1.29 (1.23-1.40).

**Etymology.** Named to honor the productive career of our friend and colleague Dr. John T. Polhemus, who collected some of the paratypes.

**Discussion.** Sexual dimorphism is much stronger in *C. polhemi* than in the other two species that we have placed in this genus (cf., Fig. 3C, D). In fact, when not associated with the males, females are very difficult to place to genus.

**Hosts.** Collected from Mexican pinyon pine, *P. cembroides* Zucc., two-needle pinyon, *P. edulis* Engelm., and one-needle pinyon, *P. monophylla* Torr. & Frém.

**Distribution.** Within the range of pinyon pine from west central Colorado and west central Utah south to western Texas.

**Holotype.** ♂, "[USA] Utah, San Juan County, Natural Bridges National Monument, (at campground) 6,500 feet, June 17, 1983, R.T. Schuh, M.D. Schwartz; *Pinus edulis* Engelm. (Pinaceae)." Deposited in the American Museum of Natural History, New York.

**Paratypes.** USA, **Arizona:** *Cochise Co.:* 4 mi W of Portal, 1,700 m, 10.vi.1980, R.T. Schuh, at light, 1♀ (AMNH); 10 mi W of Portal, 2,000 m, 11.vi.1980, R.T. Schuh, K. and R. Schmidt, 1♂ (AMNH). *Maricopa Co.:* 4 Peaks Rd, mp 11, 24.v.1982, J.T. Polhemus, ex pine, 1♀ (JTPC). *Yavapai Co.:* 1 mi E of Yarnell, 29.iv.1981, D.A. and J.T. Polhemus, 1♀ (JTPC); 5 mi N of Prescott Valley, 2,000 m, 20.vi.1980, R.T. Schuh, ex *P. edulis*, 2♂ (AMNH). **California:** *Inyo Co.:* 30 mi N of Saline Valley Lake, 4.v.1974, J.D. Pinto, 2♂ (UCR). **Colorado:** *Eagle Co.:*

Water Wheel Ranch near Bond, 24.vi.1978, J.T. Polhemus, 8♂, 8♀ (JTPC). *Mesa Co.*, Colorado Nat. Monument, Balance Rock Viewpoint, 6,000 ft, 10.vi.1982, M.D. Schwartz, ex *P. edulis*, 9♂, 9♀ (AMNH). *Pueblo Co.*, 12 mi W of Pueblo on Highway 96, 15.vi.1980, J.T. and D.A. Polhemus, 2♂, 10♀ (JTPC). **Nevada:** *Lander Co.*, Kingston Crk Cyn, Toiyabe Mtns, 6,500–7,500 ft, 28.vi.1983, R.T. Schuh and M.D. Schwartz, ex *P. monophylla*, 2♂ (AMNH). *Lyon Co.*, N boundary Toiyabe Nat. For. on Rt. 32, 1,780 m, 11.vii.1980, R.T. Schuh and G.M. Stonedahl, ex *P. monophylla*, 1♀ (AMNH). **Texas:** *Brewster Co.*: Basin, Chisos Mtns, Big Bend Nat. Park: 6,000 ft, 11.v.1959, J.F. Alpine, ex *P. cembroides*, 2♂, 4♀ (CNC); 5,400–6,000 ft, 4.v.1959, W.E.M. Mason, ex *P. cembroides*, 13♂, 12♀ (CNC). *Pecos Co.*: 36 mi S Fort Stockton, 4,500 ft, 2.v.1982, D.A. and J.T. Polhemus, 23♂, 33♀ (JTPC); Fort Stockton, 36 mi S of, 4,500 ft, 2.v.1982, D.A. and J.T. Polhemus, ex *P. edulis*, 1♀ (JTPC). **Utah:** *Emery Co.*, 6.2 mi W Rt. 24 in Temple Wash (Goblin Valley Rd.), 5,000 ft, 19.vi.1983, R.T. Schuh and M.D. Schwartz, ex *P. edulis*, 1♀ (AMNH). *Garfield Co.*: Capitol Reef Nat. Park, Grand Wash, 5,350–6,640 ft, 21.vi.1983, R.T. Schuh and M.D. Schwartz, ex *P. edulis*, 2♂, 5♀ (AMNH); 14.3 mi S of Rt. 95 on Rt. 276, 5,000 ft, 19.vi.1983, R.T. Schuh and M.D. Schwartz, at light, 1♂ (AMNH). *Grand Co.*, 11 mi SE jct 313 ♀ 163 on 313 to Dead Horse Point, 5,200 ft, 11.vi.1982, M.D. Schwartz, ex *P. edulis*, 13♂ (AMNH). *San Juan Co.*: Grand Flat near Collins Cyn, 1.vi.1982, D.A. and J.T. Polhemus, ex *P. edulis*, 3♂, 12♀ (JTPC); White Cyn at Soldiers Crossing, 4,000 ft, 29.v.1978, D.A. and J.T. Polhemus, 4♂, 1♀ (JTPC); 2.7 mi W of Rt. 95 on Rt. 263, 6,000 ft, 18.vi.1983, R.T. Schuh and M.D. Schwartz, ex *P. edulis*, 5♂, 6♀ (AMNH); Natural Bridges Nat. Monument, at cmpgrd, 6,500 ft, 17.vi.1983, R.T. Schuh and M.D. Schwartz, ex *P. edulis*, 15♂, 13♀ (AMNH).

### **Piceophylus**, new genus

Figs. 7–9

**Type species.** *Piceophylus keltoni* Schwartz and Schuh, new species

**Diagnosis.** Distinguished from other Phylini by the relatively strong sexual dimorphism, male elongate and subparallel-sided, female elongate-ovate (cf., Fig. 7A, B); the uniformly shining black dorsum with fine, reclining, evenly distributed, black, simple setae (Fig. 9D); the dusky yellow antennae, labium, and legs strongly contrasting with the coloration of the body; the pretarsus with relatively elongate claw with expanded base, minute pulvillus (Fig. 9E); and the vesica C-shaped with apex elongated and tapering, secondary gonopore small and located medially (Fig. 8B). Most similar in overall appearance to dark species with pale antennae and legs, such as *Microphylellus modestus* Reuter and *M. longirostris* Knight, but the structure of the male genitalia is distinctive from the type found in *M. modestus* and *M. longirostris*, the vesica being much more similar in structure to that of *Lineatopsallus* Henry, 1991.

**Description.** Male (Fig. 7A). *Head:* anteocular region moderately produced and slightly rounded, gently sloping in lateral view (Fig. 9A); frons with faint transverse striations; posterior margin of vertex straight; vertex slightly convex, basal carina obsolete; width of gena and gula slightly greater than diameter of antennal segment 1; buccal cavity moderately large, subovoid; eyes large (Fig. 9A), subequal to head height in lateral view, dorsal margin produced dorsal to vertex; posterolateral margin

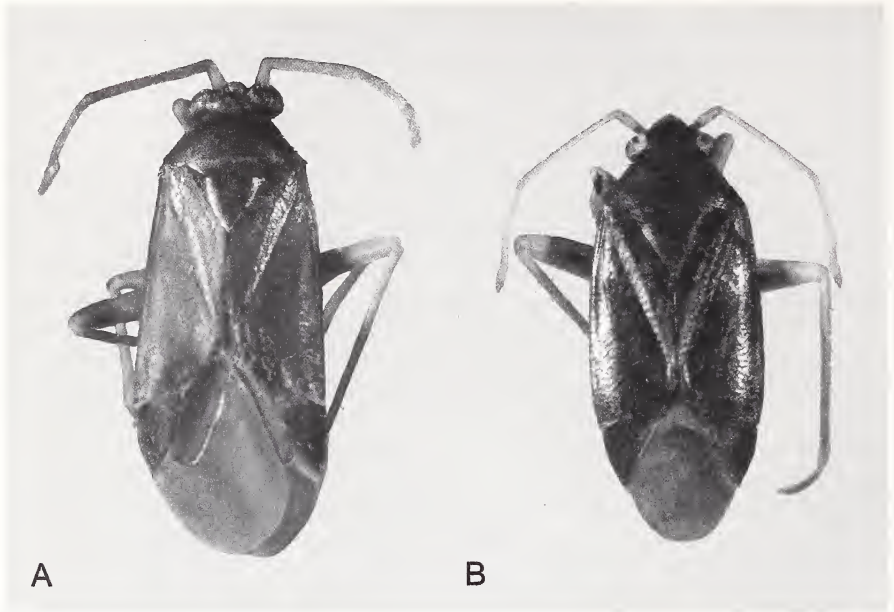


Fig. 7. Dorsal habitus photographs of *Piceophylus keltoni* Schwartz and Schuh. A. Male. B. Female.

removed from anterolateral margin of pronotum, emarginate anteriorly; antennal insertion subcontiguous to anterior margin of eye and slightly dorsal to ventral margin of eye; antenna pale yellowish orange; antennal segment 1 dark at base, slightly thickened, short; segment 2 of uniform diameter slightly less than that of segment 1, length greater than width of head across eyes; segments 3 and 4 with diameter much less than that of segments 1 and 2; labium reaching to, or slightly exceeding, apex of hind coxa. *Thorax*: pronotum conical, width two times length; lateral and posterior margins slightly concave; anterior margin sinuate medially; disk slightly convex, without distinct anterior and posterior lobes; calli slightly convex, with minute fovea medially, sometimes subconfluent; pronotum slightly flattened anterior of calli; mesoscutum broadly exposed; scutellum moderately convexly rounded; thoracic pleura subglabrous; metathoracic scent-gland evaporatory area as in fig. 9C. *Hemelytra*: moderately elongate, subparallel-sided; cuneus and membrane moderately elongate; cuneus and membrane slightly deflexed. *Venter*: with evenly distributed, reclining, pale brown, simple setae. *Legs*: tibiae without dark spots at spine bases; tibial spines pale brown. *Male genitalia*: Genital capsule: relatively small, elongate and conical, apex slightly truncate. Left paramere (Fig. 8D): small; anterior lobe gently pointed, length shorter than that of posterior lobe, posterior lobe sharply attenuate and slightly recurved. Right paramere (Fig. 8C): ovoid and pointed apically. Phallosome (Fig. 8A): moderately narrow and elongate; dorsal surface with slightly expanded aperture. Vesica (Fig. 8B): C-shaped, widest at level of secondary gonopore, sharply attenuated distal to secondary gonopore; anterior and posterior straps

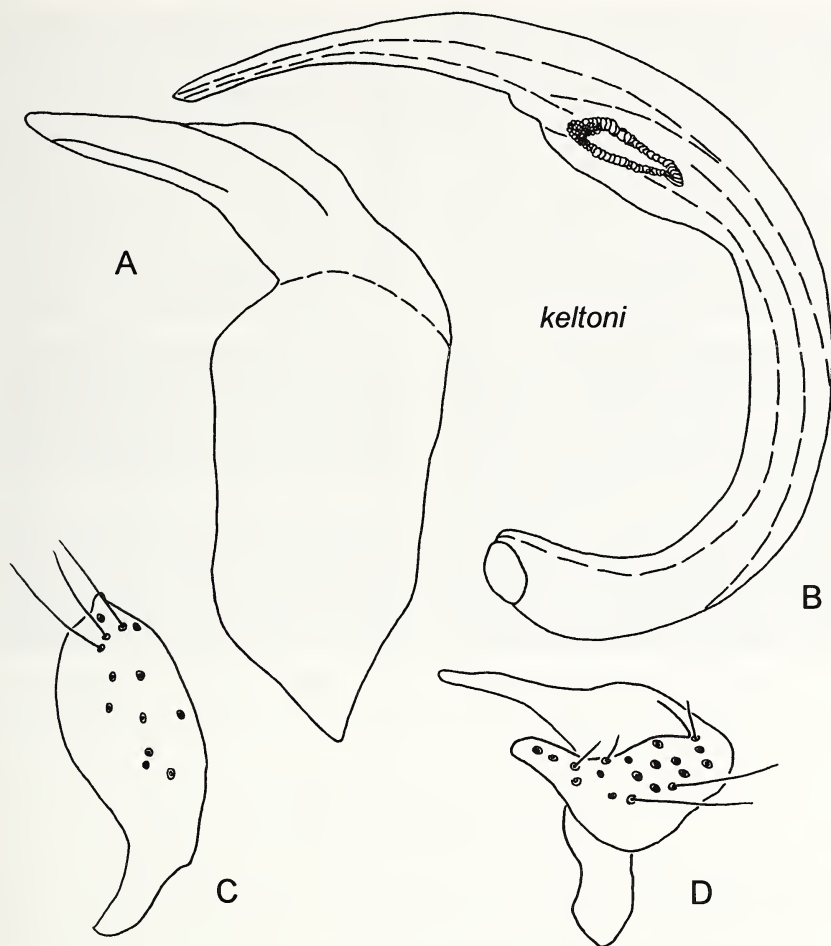


Fig. 8. Male genitalia of *Piceophylus keltoni* Schwartz and Schuh. A. Phallosome. B. Vesica. C. Right paramere. D. Left paramere.

unified basal to secondary gonopore; posterior strap terminated at level of secondary gonopore; secondary gonopore small, ovoid, situated medially on vesica.

**Female** (Fig. 7B). Similar to male except eyes smaller, vertex wider, diameter of antennal segment 2 distinctly smaller than in male, hemelytra slightly convex laterally, cuneal fracture at position of sixth sternite, and membrane extending slightly beyond apex of abdomen.

**Etymology.** Named for the apparent strict host association of the included species with *Picea* spp. (Pinaceae); masculine.

**Discussion.** The genus currently includes one species known from eastern North America with an apparently isolated population in the Cypress Hills of Alberta.

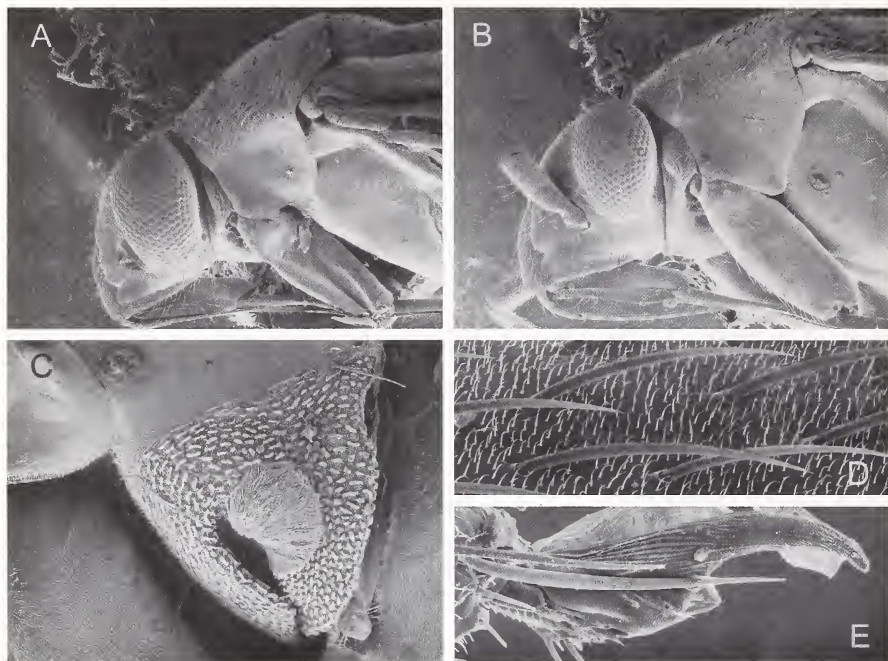


Fig. 9. Photomicrographs of *Piceophylus keltoni* Schwartz and Schuh. A. Head and propleuron, lateral view, male. B. Head and propleuron, lateral view, female. C. Ostiolar peritreme. D. Dorsal setae. E. Pretarsus, lateral view.

### *Piceophylus keltoni*, new species

Figs. 7-9

**Diagnosis.** Recognized by the shining castaneous to nearly black dorsum with short, evenly distributed, fine, black, simple setae (Fig. 7A); yellowish orange legs, antennae, and labium; femora and tibia without dark spots; vesica C-shaped, with medially located secondary gonopore (Fig 8B). General appearance and coloration similar to *Microphylellus modestus*, but antennae much more strongly sexually dimorphic than in that species and the form of the vesica also distinctive.

**Description.** Male (Fig. 7A). Total length 4.2 (3.5-4.4); cuneus and membrane moderately long; ratio of head width across eyes to cuneus length along lateral margin 1.00:1.00 to 1.04:1.00; uniformly shining castaneous to nearly black. *Head*: width 0.76 (0.71-0.78); vertex width 0.33 (0.30-0.36); eyes large; antennae yellowish orange; base of segment 1 dark; segment 2 sometimes slightly darkened; antennal measurements 0.28 (0.25-0.30): 1.13 (0.97-1.19): 0.73 (0.70-0.83): 0.41 (0.38-0.43); labium pale, reaching to slightly exceeding apex of hind coxae, length 1.54 (1.46-1.63). *Thorax*: propleuron, mesoscutum, scutellum, and peritremal disk black. *Hemelytra*: membrane and veins infusate. *Venter*: black. *Legs*: yellowish orange; bases of coxae darkened, tibial spines yellow. *Genitalia*: see Fig. 8.

*Female* (Fig. 7B). Similar to male except: total length 3.5 (3.3-3.9); head width 0.74 (0.71-0.81); vertex width 0.39 (0.36-0.42); eyes smaller; antennal measurements

0.26 (0.24–0.29); 0.99 (0.87–1.09); 0.61 (0.55–0.70); 0.39 (0.38–0.40); length of labium 1.63 (1.50–1.75).

**Etymology.** Named for Dr. Leonard A. Kelton, former Research Scientist with Agriculture and Agri-Food Canada, who first recognized this species as new (albeit in *Microphylellus* Reuter) in an unpublished manuscript on the plant bugs of eastern Canada.

**Discussion.** In light of the known distribution of *Piceophylus keltoni*, we have searched the literature on Palearctic Phylinae in an attempt to determine whether it might actually be a Holarctic species. The genitalia of “*Psallus*” *holomelas* Reuter, 1906, from Szechwan, China are similar, but the coloration of that species is very different as suggested by its name (see Kerzhner, 1997:246–247).

**Hosts.** Primarily taken on white spruce, *Picea glauca* (Moench) Voss., but also known from *P. abies* (L.) Karst. and *Abies balsamea* (L.) Mill.

**Distribution.** From the Canadian Maritime Provinces east to Québec, Ontario, and the Cypress Hills of Alberta, south in the eastern United States to New Hampshire.

**Holotype.** ♂, “[CANADA] Yarmouth, N[ova], S[cotia], 19-VII-1966 L.A. Kelton; on *Picea*.” Deposited in the Canadian National Insect Collection, Agriculture and Agri-Food Canada, Ottawa.

**Paratypes.** CANADA, **Alberta:** Cypress Hills Prov. Park, Top Rd, 1.2 km E Spruce Coulee, 16.vi.1990, M.D. Schwartz, ex *Picea glauca*, 1♂, 11♀ (CNC); Kananaskis Highway, 25.vi.1973, L.A. Kelton, ex *Salix*, 1♂ (CNC). **New Brunswick:** Edmundston, 29.vi.1966, L.A. Kelton, ex *Picea* sp., 6♂, 8♀ (CNC); Fredericton, 23.vi.1966, L.A. Kelton, 1♂ (CNC); Fredericton, Univ. New Brunswick, 27.vi.1993, A.G. Wheeler, Jr., ex *Picea glauca*, 2♀ (USNM); Kouchibouguac Nat. Park, 23.vi.1978, L.A. Kelton, ex *Picea*, 1♂, 3♀ (CNC). Nash Crk, 28.vi.1966, L.A. Kelton, 3♀ (CNC); Petersville, 5.vii.1966, L.A. Kelton, 1♀ (CNC); Shemoque, 7.vii.1966, L.A. Kelton, ex *Picea*, 9♀ (CNC). **Nova Scotia:** Bible Hill, 12.vii.1966, L.A. Kelton, 1♀ (CNC); Cape Breton Nat. Park, 22.vii.1966, L.A. Kelton, 1♀ (CNC); Halifax, 22.vii.1976, L.A. Kelton, ex *Picea*, 6♀ (CNC). Kentville: 3.vii.1976, L.A. Kelton, 1♀ (CNC); ex *Picea* sp., 1♀ (CNC); Yarmouth, 19.vii.1966, L.A. Kelton, 5♂, 12♀ (CNC). **Ontario:** Blackburn, 18.vi.1932, W.J. Brown, 2♀ (CNC); Lambeth, 29.vi.1961, Kelton and Brumpton, 5♀ (CNC); Marathon, 28.vi.1961, D. Brown, ex *Picea*, 1♀ (CNC); Ottawa, Central Experimental Farm, 7.vi.1991, M.D. Schwartz, ex *P. abies*, *P. glauca*, 6♀ (CNC). Sault St. Marie, 27.vii.1960, Kelton and Whitney, ex spruce, 1♀ (CNC); Thessalon, 1.vii.1965, W. Gagné, ex *Picea*, 1♂ (UCB). Round Barn Rd, off of Rt 17, 2.vii.1990, M.D. Schwartz, ex *P. glauca* (CNC): 5 mi E of, 1♀; 6 mi E of, 1♂, 7♀. 3 km E of jct of Rts 17 ♀ 548, rd to Saint Josephs Island, 2.vii.1990, M.D. Schwartz, ex *Achillea* sp., 1♀ (CNC). **Prince Edward Island:** Brackley Beach, 10.vii.1966, L.A. Kelton, 1♀ (CNC); Cavendish Nat. Park, 9.vii.1966, L.A. Kelton, 1♂, 11♀ (CNC); Dalvey, 10.vii.1966, L.A. Kelton, 4♀ (CNC). **Québec:** Aylmer, 2.vii.1936, G.S. Walley, ex spruce, 1♀ (CNC); Baie-de-Gaspé-Nord, Forillon National Park, Penouile Beach, parking lot, 10 m, 20.vii.1995, M.D. Schwartz, ex *P. glauca*, 2♀ (CNC); Cap-Chat, Centre d’interprétation du vent et de la mer, parking, 16.vii.1995, M.D. Schwartz, ex *Abies balsamea*, 3♀ (CNC); Drummondville, 19.vi.1966, L.A. Kelton, 1♂ (CNC); Fabr , 5.vii.1963, L.A. Kelton, ex *Picea*, 15♀ (CNC); Lac Mondor, Ste. Flore, 24.vi.1961, E.G. Munroe, 1♀ (CNC); Ladysmith, 24.vii.1958, L.A. Kelton, 1♀ (CNC); Laniel, 7.iii.1966, L.A. Kelton, 3♂,



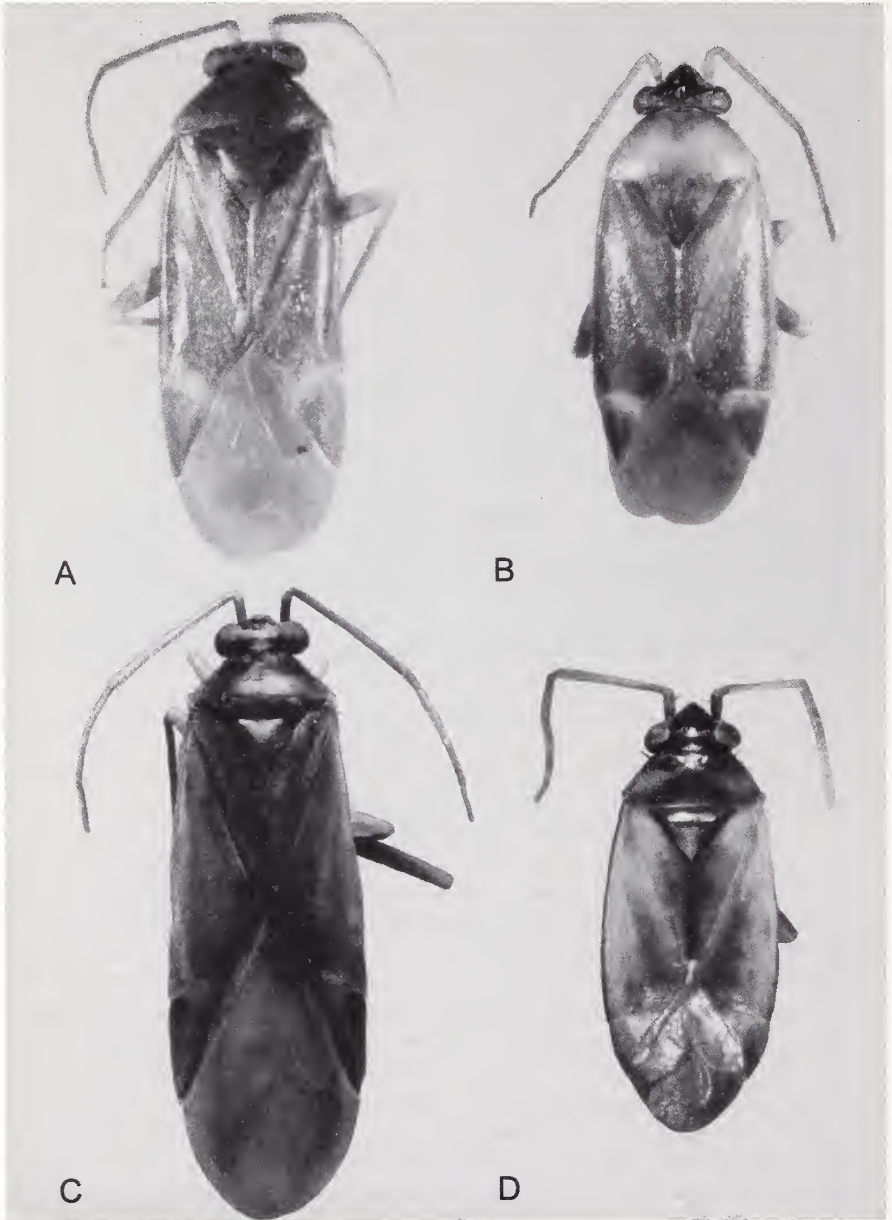


Fig. 10. Dorsal habitus photographs of *Pinophylus* spp. A, B. *P. carneolus* (Knight). A. Male. B. Female. C, D. *P. rolfsi* (Knight). C. Male. D. Female.

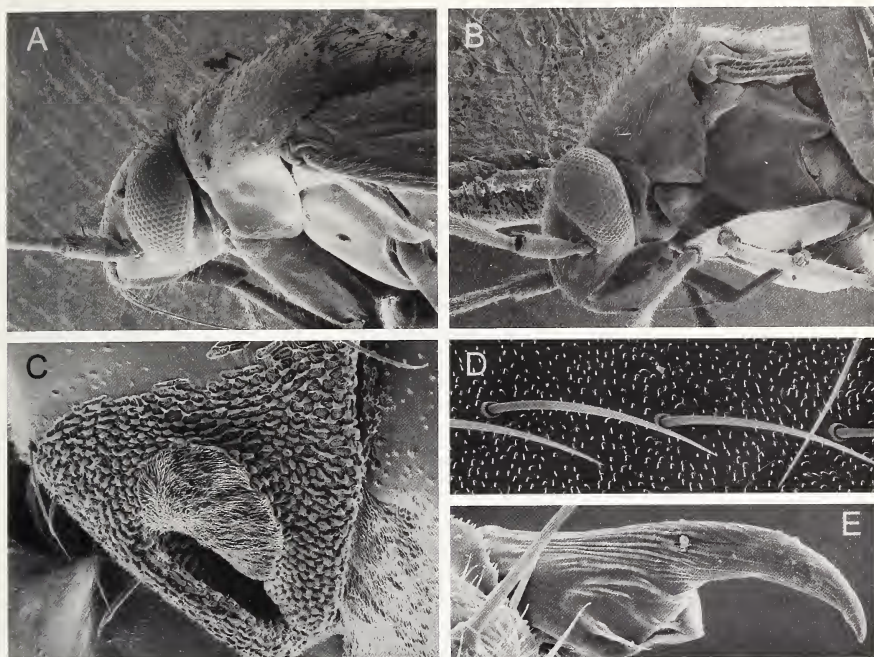


Fig. 11. Photomicrographs of *Pinophylus carneolus* (Knight). A. Head and propleuron, lateral view, female. B. Head and propleuron, lateral view of male. C. Ostiolar peritreme. D. Dorsal setae. E. Pretarsus, lateral view.

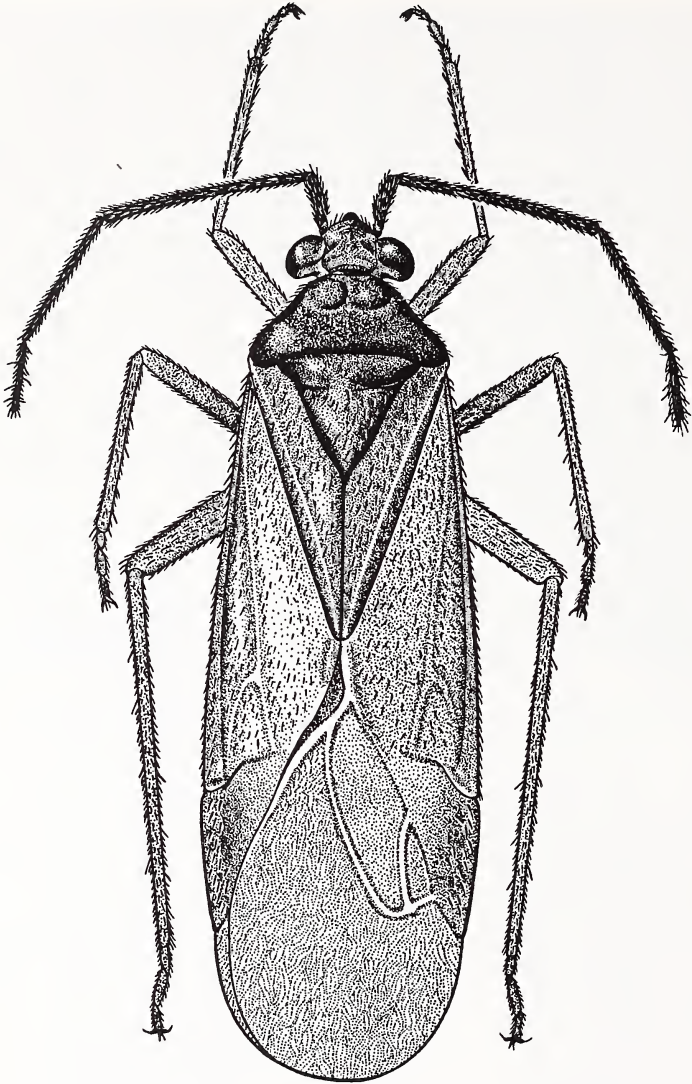
3 ♀ (CNC). USA, **New Hampshire:** *Cheshire Co.*, Mt. Monadnock, 22.vii.1954, J.A. Slater, 1 ♀ (AMNH). **New York:** *Jefferson Co.*, Watertown, A.G. Wheeler, Jr.: 10.vi.1989, taken as fifth instar, ex *P. glauca*, 24 ♂, 25 ♀ (USNM); 18.vi.1988, ex *P. glauca*, 2 ♀ (USNM). **South Dakota:** *Lawrence Co.*, Englewood, Black Hills, 5.viii.1971, L.A. Kelton, 1 ♀ (CNC). **Vermont:** *Essex Co.*, North Concord, 1,082 ft, 8.vi.1978, L.A. Kelton, ex *Picea* sp., 1 ♀ (CNC).

### **Pinophylus**, new genus

Figs. 10–15

**Type species.** *Plagiognathus rolfsi* Knight, 1964

**Diagnosis.** Distinguished from other Phylini by the following combination of characters: strongly sexually dimorphic (cf., Fig. 10C, D), the male relatively large, subparallel-sided and greatly elongate, the female elongate-ovoid and much shorter; cuneus in males greatly elongated and relatively narrow; dorsum subshining to shining ranging from largely reddish to brownish black, with inconspicuous, short, fine, reclining, evenly distributed, blackish brown, simple setae (Figs. 11D, 14D); pretarsus with relatively elongate claws with slightly expanded base, and small pulvillus (Figs. 11E, 14E). The vesica is variably shaped and cannot be easily used to characterize the group (cf., Fig. 13A, E, F). Similar in general appearance to large *Pla-*



0.1mm

Fig. 12. Dorsal habitus illustration of *Pinophylus rolfsi* (Knight).

*giognathus* spp., but sexual dimorphism much stronger and structure of male genitalia unlike that of *Plagiognathus*.

**Description.** Male (Figs. 10A, C, 15A). *Head:* transverse, antecular region weakly rounded and slightly produced beyond eyes in dorsal view; frons gently sloping in lateral view, with faint transverse striations; vertex flattened, posterior margin

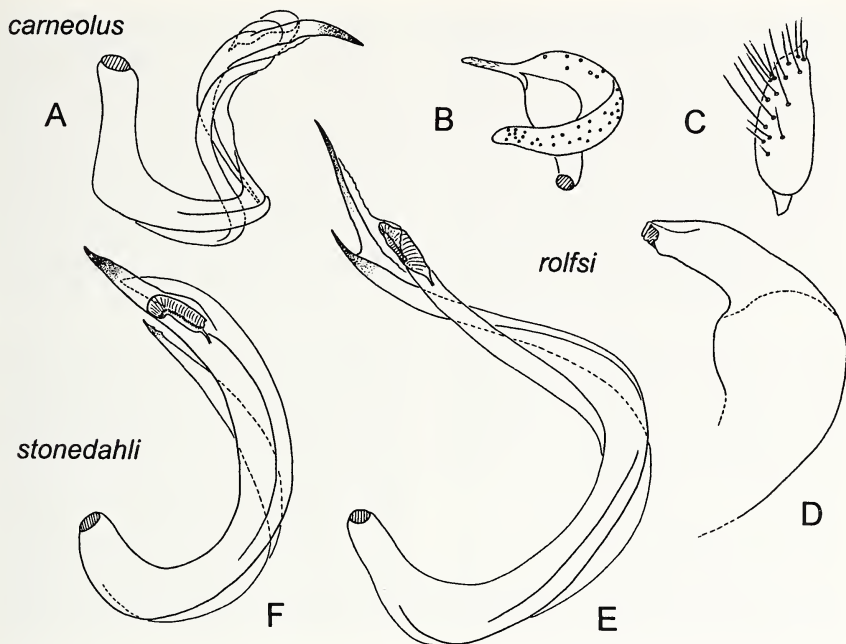


Fig. 13. Male genitalia of *Pinophylus* spp. A. *P. carneolus* (Knight), vesica. B–E. *P. rolfsi* (Knight). B. Left paramere. C. Right paramere. D. Phallosome. E. Vesica. F. *P. stonedahli* Schwartz and Schuh, vesica.

straight, basal carina obsolete; gena about as wide as diameter of antennal segment 1, gula ranging from obsolete to as long as diameter of antennal segment 1; buccal cavity moderately large, ovoid; eyes large, four-fifths head height in lateral view, dorsal margin produced dorsal to vertex, posterolateral margin removed from anterolateral margin of pronotum, emarginate anteriorly; antennal insertion subcontiguous with anterior margin of eye, insertion slightly dorsal of ventral margin of eye; antennal segment 1 short, segment 2 linear, length greater than width of head across eyes, segments 3 and 4 of diameter less than segments 1 and 2; labium reaching from apex of hind coxa to abdominal sternum 5. *Thorax*: pronotum subconical, twice as wide as long, lateral margins ecarinate, straight, posterior margin slightly concave, disk flattened, without distinct anterior and posterior lobes, calli slightly convex, sometimes subconfluent medially; mesoscutum broadly exposed; scutellum slightly convex; thoracic pleura subglabrous; metathoracic scent-gland evaporatory area as in fig. 11. *Hemelytra*: elongate, subparallel-sided; cuneus and membrane long, cuneal fracture at level of apex of genital segment and membrane extending far beyond apex of genital segment (Fig. 14C); cuneus much longer, than broad, slightly deflexed. *Venter*: with reclining, pale brown simple setae. *Legs*: tibial spines without dark spots at bases. *Male genitalia*: Genital capsule: elongate and conical. Left paramere (Fig. 13B): small, anterior lobe relatively long, length subequal to posterior lobe, posterior lobe sharply attenuate and slightly recurved.

Right paramere (Fig. 13C): subovoid with small apical point; sometimes ventral margin with slightly produced. Phallosome (Fig. 13D): relatively narrow and elongate, with slot-like aperture. Vesica (Figs. 13A, E, F): of variable shape and length, comprising two straps, gonopore subapical.

**Female** (Figs. 10B, D, 15B). Very different in appearance from male: head much more strongly produced beyond eyes, frons bulging in dorsal view, eyes smaller, vertex wider than in male; diameter of antennal segment 2 smaller than in male; pronotum often campanulate; body form much more robust and compact than in male, hemelytra moderately convex laterally, position of cuneal fracture equal to seventh sternite and membrane extending, at most, slightly beyond apex of abdomen. Color variation in females often much greater than in males.

**Etymology.** Named for the association of most known specimens with species of *Pinus* (Pinaceae); masculine.

**Discussion.** *Pinophylus*, like *Coniferocoris*, has a superficial appearance very much like that of many *Plagiognathus* species. It is little wonder then that Knight described *P. rolfsi* in *Plagiognathus*. Characters other than general appearance militate against placement in *Plagiognathus*, however, most prominent being the form of the male genitalia.

*Pinophylus carneolus* (Knight), new combination

Figs. 10A, B, 11, 13A

*Plagiognathus carneolus* Knight, 1927: 10 (n. sp.).

**Diagnosis.** Recognized by the slightly reddish brown coloration of most specimens and the form of the male genitalia, with a more strongly curving vesica (Fig. 13A) than is found in *Pinophylus rolfsi* (Fig. 13E) and *P. stonedahli* (Fig. 13F).

**Redescription.** Male (Fig. 10A). Moderately large species, total length 4.2 (4.0–4.3); dorsum moderately and uniformly shining reddish brown or red, base of cuneus on mesial half with a white quadrate mark; dorsum with sparsely to evenly distributed, reclining, fine, brown simple setae. **Head:** deeply red to castaneous, width 0.82 (0.79–0.84); vertex width 0.33 (0.31–0.35); antennae pale and tinged with red to weakly infusate; antennal measurements 0.26 (0.24–0.28): 1.11 (1.06–1.15): 0.57 (0.48–0.66): 0.45 (0.36–0.60); labium pale to weakly infusate, reaching to about apex of hind coxa, length 1.41 (1.28–1.49). **Thorax:** mesoscutum and scutellum reddish brown, pleuron red, including metathoracic scent-gland evaporatory area. **Hemelytra:** membrane and veins infusate. **Venter:** pale with some red. **Legs:** pale to weakly infusate, base of coxae often darker. **Genitalia:** see Figs. 13A.

**Female** (Fig. 10B). Body form elongate ovoid, much more compact than in male; hemelytra relatively short, nearly conforming to shape of abdomen, cuneus short, length and width subequal. Total length 3.8 (3.72–3.86); head width 0.81 (0.79–0.83); vertex width 0.38 (0.37–0.39); eyes smaller than in male; antennal measurements 0.24 (0.23–0.25): 0.95 (0.92–1.00): 0.61 (0.56–0.65): 0.38 (0.36–0.40); labium reaching to apex of metacoxa, length 1.49 (1.49–1.59).

**Host.** Breeds on Virginia pine, *Pinus virginiana* Mill., appearing early in the season (Knight 1927).

**Distribution.** Reported from District of Columbia, Maryland (east central) Pennsylvania, Virginia and Wisconsin (Henry and Wheeler 1988) and West Virginia (Wheeler

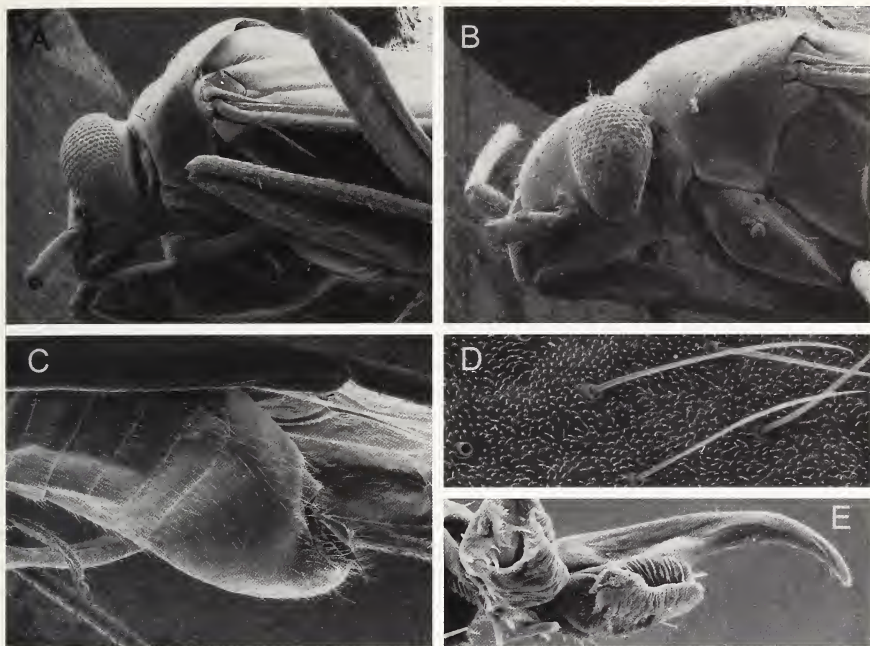


Fig. 14. Photomicrographs of *Pinophylus rolfsi* (Knight). A. Head and propleuron, lateral view, male. B. Head and propleuron, lateral view of female. C. Genital capsule, male. D. Dorsal setae. E. Pretarsus, lateral view.

er, et al. 1988, pg. 137). The Wisconsin record could not be verified. For new records, including North Carolina, see Wheeler (1999, this issue).

**Discussion.** The placement of *carneolus* in *Pinophylus* is based heavily on the sexual dimorphism which is of the same type found in *P. rolfsi* (Knight) and *P. stonedahli*, new species. The genitalia are heterogeneous among these three species and by themselves do not offer a single distinctive feature diagnostic for *Pinophylus*. The distribution might be considered somewhat unusual among North American Phylinae, in that many genera which are speciose in the west and which do not also have representatives at higher latitudes do not have representatives in the eastern United States. Nonetheless, *P. carneolus* shows much greater affinity with the western *Pinophylus* species than with *Plagiognathus*, the genus in which it was originally described, on the basis of head structure, sexual antennal dimorphism, and overall sexual dimorphism. We have therefore placed it in *Pinophylus*. Furthermore, the genitalia are not of the *Plagiognathus* type.

**Material examined.** USA, **Maryland:** *Anne Arundel Co.*, Odenton, 5.v.1918, W.L. McAtee, ex *Pinus virginiana*, 1♂ (CNC). **Virginia:** *Arlington Co.*, E of Falls Church, 13.v.1911, S.A. Rohwer, 1♂ (USNM). We have examined 41 additional specimens from Maryland, North Carolina, Pennsylvania, and Virginia which are listed in Wheeler (1999, this issue).

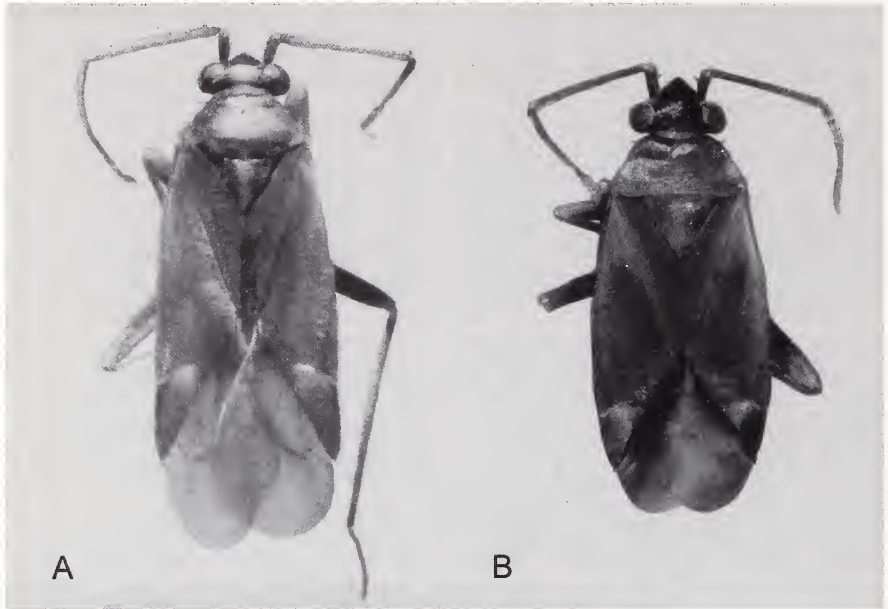


Fig. 15. Dorsal habitus photographs of *Pinophylus stonedahli* Schwartz and Schuh. A. Male. B. Female.

*Pinophylus rolfsi* (Knight), new combination

Figs. 10C, D, 12, 13B-E, 14

*Plagiognathus rolfsi* Knight, 1964: 145 (n. sp.).

**Diagnosis.** Most easily distinguished from *P. stonedahli* by the J-shaped vesica, with distal portion extending beyond level of vesical base and attributes of apical spines (Fig. 13E). Males easily distinguished from *P. carneolus* by their brownish black rather than reddish coloration.

**Redescription.** Male (Figs. 10C, 12). Total length 5.2 (4.6-5.2); ratio of head width across eyes to cuneus length along lateral margin 1.00:0.86 to 1.00:1.28; uniformly shining blackish brown, sometimes base of cuneus with reddish infuscation; dorsum with sparsely to evenly distributed, reclining, fine brown simple setae. *Head:* brownish black, including vertex; width 0.81 (0.78-0.85); vertex width 0.32 (0.30-0.33); antennae yellowish brown to brown; segments 3 and 4 dusky yellow; antennal measurements 0.30 (0.30-0.31): 1.29 (1.24-1.35): 0.93 (0.90-0.95): 0.48 (0.45-0.50); labium brown, reaching apex of, to extending slightly beyond, hind coxa, length 1.65 (1.60-1.68). *Thorax:* propleura, mesoscutum, scutellum, and peritremal disk brownish black. *Hemelytra:* base of cuneus usually dark reddish brown, sometimes small males with base of cuneus slightly pale white; membrane and veins infuscate. *Venter:* black. *Legs:* yellowish brown to brown; sometimes fore coxa and apical portion of other coxae pale white. *Genitalia:* see Fig. 13B-E.

*Female* (Fig. 10D). Total length 3.9 (3.6-4.5); head width 0.84 (0.80-0.93); vertex width 0.41 (0.39-0.45); eyes smaller; antennal measurements 0.30 (0.29-0.33): 1.22

(1.08–1.38): 0.84 (0.80–0.90): 0.44 (0.43–0.45); labium brown, reaching apex of hind coxa to middle extending to middle of abdomen, length 1.94 (1.80–2.20).

**Discussion.** Over the range of this species total body length and length of the antennal segment 2 and labium show considerable variation, which initially suggested to us that the specimens examined represented more than one species. Although the length and shape of the distal portion of the vesica also exhibits some variation, we did not find any consistent differences which would allow us to recognize more than one species.

**Hosts.** Most commonly found on species of *Pinus*, but also known to occur on *Abies*, *Picea*, and *Pseudotsuga* spp.

**Distribution.** Southern Alaska and the Yukon, south through British Columbia, to Oregon and east to Colorado.

**Material examined.** CANADA, **Alberta:** Kananaskis Highway, 25.vii.1973, L.A. Kelton, 1 ♀ (CNC); Lake Louise, 3.viii.1970, L.A. Kelton, 5 ♀ (CNC). **British Columbia:** Anarchist Mtn, Osoyoos, 13.vii.1970, L.A. Kelton, 1 ♀ (CNC); Blackwall Peak Area, Naturalist Hut, Manning Prov. Park, alpine meadow, 19.viii.1998, M.D. Schwartz, ex *Pinus albicaulis*, 4 ♀ (UBC); Blackwall, Manning Prov. Park, 23.vii.1970, L.A. Kelton, ex *P. albicaulis*, 25 ♂, 18 ♀ (CNC). Fenton Lake, Tweedsmuir Prov. Park, W.A. Low (UBC): 27.vii.1963, 1 ♀; 15.viii.1963, 1 ♀ (UBC). Fraser, 29.vii.1982, G.G.E. Scudder, 2 ♀ (CNC); Mount Revelstoke Nat. Park, 30.vii.1970, L.A. Kelton, ex *Abies lasiocarpa*, 1 ♂, 2 ♀ (CNC); Mount Kobau, Osoyoos, 13.viii.1997, G.G.E. Scudder, ex *A. lasiocarpa*, 1 ♀ (UBC); Rossland, 9.viii.1970, L.A. Kelton, 1 ♀ (CNC). Summerland, L.A. Kelton (CNC): 2.vii.1974 2 ♀; 24.vi.1975, ex *Pseudotsuga menziesii*, 1 ♀; 10 mi W of, 12.vii.1974, 1 ♀. Summit Lake, 16.viii.1982, L.A. Kelton, ex *Pinus contorta*, 7 ♀ (CNC); Yoho Nat. Park, 16.vii.1970, L.A. Kelton, 12 ♀ (CNC). **Yukon Territory:** Alaska Highway, mi 783, 19.vii.1961, ex *P. contorta*, 1 ♀ (CNC); Boundary, 19.8 km E, 11.vii.1983, G.G.E. Scudder, 1 ♂ (UBC); Calumet, 9.viii.1963, ex *A. lasiocarpa*, 1 ♀ (CNC); Dawson, 21.vii.1982, L.A. Kelton, 1 ♂ (CNC); Destruction Bay, 26.vii.1982, L.A. Kelton, ex *Picea* sp., 7 ♀ (CNC); McRae, 4.viii.1960, ex *P. glauca*, 1 ♀ (CNC); Moose Crk, 18.vii.1982, L.A. Kelton, 1 ♀ (CNC); Rancheria, 11.vii.1982, L.A. Kelton, ex *Pinus contorta*, 10 ♀ (CNC); Tagish, 17.vii.1983, L.A. Kelton, 1 ♀ (CNC). USA, **Colorado:** *Chaffee Co.*, Monarch Pass, San Isabel Nat. For., 10,500 ft, 28.viii.1968, L.A. Kelton, ex *P. contorta*, 4 ♀ (CNC). *Clear Creek Co.*: Juniper Pass: on Rt 103, 10,500 ft, 21.viii.1986, R.T. Schuh and J.T. Polhemus, ex *P. aristata*, 10 ♀ (AMNH); picnic grounds, 11,000 ft, 7.viii.1987, T.J. Henry, ex *P. aristata*, 4 ♂, 1 ♀. Mt Goliath area: 11,200 ft, 7.viii.1987, D.A. and J.T. Polhemus, ex *P. aristata*, 3 ♂ (JTTPC); 21.viii.1986, R.T. Schuh, J.T. and D.A. Polhemus, ex *P. aristata*, 22 ♂, 52 ♀ (AMNH); below, 11,500 ft, 7.viii.1987, T.J. Henry, ex *P. aristata*, 9 ♂, 18 ♀ (USNM). Mt Evans, 11,000 ft, 21.viii.1982, J.T. Polhemus, 7 ♂, 8 ♀ (JTTPC); Squaw Pass Rd, 21.viii.1984, J.T. and D.A. Polhemus, ex *P. contorta*, 6 ♀ (JTTPC); West Chicago Crk, Arapaho Nat. For., 9,800 ft, 28–29.vii.1968, L.A. Kelton, ex *P. contorta*, 6 ♀ (CNC). *Gilpin Co.*, Rollinsville, Roosevelt Nat. For., 1.viii.1968, L.A. Kelton, ex *P. contorta*, 1 ♀ (CNC). *Grand Co.*, 3 mi SE of Fraser, St. Louis Crk Cmpgnd, 8,800 ft, 28.vii.1967, F. P., and M. Rindge, 1 ♀ (AMNH). *Gunnison Co.*, Taylor Park, 25.vii.1982, J.T. Polhemus, 5 ♀ (JTTPC). *Park Co.*, Geneva Park, Grant, 10,000 ft, 7.viii.1914, F.C. Jackson, 2 ♀ (USNM). *Pitkin Co.*, Aspen White River Nat. For.,



24.viii.1968, L.A. Kelton (CNC): ex *P. contorta*, 2♀; ex *Picea* sp., 1♀. *Summit Co.*: Loveland Pass Summit, 12,000 ft, 7.viii.1961, C.H. Mann, 1♀ (CNC). Vail Pass summit, 10,350 ft, 11.viii.1987, ex *P. flexilis*: J.T. and D.A. Polhemus, 3♀ (JTPC); T.J. Henry, 3♀ (USNM). 8.7 mi W jct Hwy 91 on I-70, 14.viii.1980, G.M. Stonedahl, ex *P. contorta*, 1♀ (AMNH). *Weld Co.*, Brainard Lake, Roosevelt Nat. For., 10,300 ft, 2.viii.1968, L.A. Kelton, ex *P. flexilis*, 9♂, 24♀ (CNC). **Idaho**: *Bear Lake Co.*, Bloomington Lake, 24.vii.1982, M.D. Schwartz, ex *A. engelmanni*, 1♀ (AMNH). *Lemhi Co.*, 3 mi W of Gilmore, Meadow Lake Cmpgnd, 9,600 ft, 31.vii.1994, M.D. Schwartz, ex *P. albicaulis*, 3♂, 7♀ (CNC). **Oregon**: *Clackamas Co.*, 1 mi S of Government Camp, 25.vii.1966, W. Gagné, J. Haddock, ex *P. contorta*, 1♀ (UCB). *Deschutes Co.*, 6 mi SW Sisters on FS Rd 1536, 29.vii.1980, M.D. Schwartz, ex *P. ponderosa*, 1♂ (AMNH). *Grant Co.*, Wildcat Springs Cmpgrd, T14S R33E Sec 10, 21.vii.1979, M.D. Schwartz, ex *P. contorta*, 1♀ (AMNH). *Hood River Co.*, Mt Hood, Cloud Cap, 6,000 ft, 5.ix.1979, G.M. Stonedahl, ex *P. contorta*, 1♀ (AMNH). *Lane Co.*, Willamette Nat. For., Hand Lake Trail, 4,750 ft, 29.vii.1979, M.D. Schwartz, 5♀ (AMNH). *Linn Co.*, Willamette Nat. For., Mowich Lake, 5,000 ft, 8.vii.1979, M.D. Schwartz, ex *P. contorta*, 1♂, 2♀ (AMNH). **Utah**: *Salt Lake Co.*, Alta (rd to cmpgrd), 10,000 ft, 8.viii.1982, M.D. Schwartz, ex *Picea engelmanni*, 1♀ (AMNH). **Washington**: *Whatcom Co.*, Mt Baker Nat. For., R9E T39N Sec 17, 7.ix.1979, G.M. Stonedahl, ex *A. amabilis*, 1♀ (AMNH). *Yakima Co.*: Mt Adams, A.R. Rolfs (USNM): 15.vii.1932, holotype♂, allotype♀, 1♂, 6♀ paratypes; 3.viii.1930, 1♂.

### *Pinophylus stonedahli*, new species

Figs. 13F, 15

**Diagnosis.** Definitely distinguished from small specimens of *Pinophylus rolfsi* by the vesica, which is stout, C-shaped and with a short portion distal to the secondary gonopore. Usually recognizable by the whitish translucent base of the cuneus, and the shorter cuneus and hemelytral membrane. In *P. rolfsi* the cuneal base is usually suffused with red and the cuneus and membrane are longer. Males easily distinguished from *P. carneolus* by their brownish black rather than reddish brown coloration.

**Description.** Male (Fig. 15A). Total length 4.1 (4.0–4.5); ratio of head width across eyes to cuneus length along lateral margin 1.00:1.33; uniformly shining blackish brown, sometimes base of cuneus pale white or translucent; dorsum with sparsely to evenly distributed, reclining, fine, brown, simple setae. *Head*: brownish black; width 0.82 (0.80–0.86); vertex width 0.33 (0.28–0.34); antennae brown; antennal measurements 0.28: 1.15 (1.10–1.25): 0.93: 0.45; labium brown, reaching apex of hind coxa to slightly beyond, length 1.65 (1.64–1.66). *Thorax*: propleura, mesoscutum, and scutellum, and peritremal disk brownish black. *Hemelytra*: membrane and veins infuscate. *Venter*: black. *Legs*: uniformly dark orange brown to brown. *Genitalia*: see Fig. 13F; ventral margin of right paramere slightly expanded. *Female* (Fig. 15B). Total length 3.6 (3.5–3.7); head width 0.78 (0.75–0.83); vertex width 0.39 (0.38–0.42); antennal measurements 0.27 (0.25–0.28): 0.98 (0.95–1.15): 0.68 (0.65–0.70): 0.38; labium brown, reaching base of ovipositor, length 1.83 (1.80–1.84).

**Etymology.** Named for our good friend and colleague Dr. Gary M. Stonedahl, who collected some of the specimens upon which the description of this species is based.

**Discussion.** *Pinophylus stonedahli* itself shows little size variation in the available sample, but is practically indistinguishable from small specimens of the highly variable *P. rolfsi*, without examination of the male vesica.

**Hosts.** Only taken on limber pine, *Pinus flexilis* James.

**Distribution.** The Beartooth and Wind River Mountains of southern Montana and northern Wyoming.

**Holotype.** ♂, "USA, Montana, Carbon County, Rock Creek Vista Pt. on Rt. 212, NE of Beartooth Summit, 9,100 feet, August 11, 1986, Schwartz and Stonedahl; on *Pinus flexilis* James (Pinaceae)." Deposited in the American Museum of Natural History, New York.

**Paratypes.** USA, Montana: Carbon Co.: same as for holotype, 10♂, 10♀ (AMNH).

**Wyoming:** Sublette Co.: Wind River Mts., 20 mi N of Pinedale, 10,200 ft, 16.viii.1981, M.D. Schwartz, ex *P. flexilis*, 1♂, 12♀ (AMNH); Big Sandy Trailhead, Billy Lake, 24.viii.1981, M.D. Schwartz, ex *P. flexilis*, 1♂, 48♀ (AMNH); Elkhart Park Trail to Hobbs Lake, Wind River Mtns, 20 mi N of Pinedale, 10,200 ft, 16.viii.1981, ex *P. flexilis*, 1♂ (AMNH); 25 mi SE Jackson, Hobart River, 27.vi.1966, W. Gagne, J. Haddock, 1♀ (UCB). Teton Co., Teton Nat. Park, 31.vii.1931, H.H. Knight, 1♂ (USNM).

**Additional specimens.** USA, Wyoming: Park Co., Yellowstone Nat. Park, 4.viii.1931, H.H. Knight, 3♀ (USNM).

### *Psallovirus* Henry

*Psallovirus* Henry 1999: 107.

**Diagnosis.** Distinguished from other small brown Phylini by the overall shining dark coloration with basal margin of cuneus pale (Figs. 16A, B, 17); the slender pale or black antennae; the dorsum and thoracic pleura with evenly distributed, recumbent, silvery white, scale-like setae and reclining, longer, shining, brown, simple setae; the pretarsus with long claws with narrow base, minute pulvilli and long setiform parmpodia; and the J-shaped vesica with minutely spinose distal region of the terminal secondary gonopore. The general appearance and coloration are most similar to those of *Ranzovius* Distant, but *Psallovirus* differs by the much more slender antennal segment 2, the shorter anterior and ventral portion of the head, and the longer more curved claws.

**Discussion.** Henry (1999) described *Psallovirus* to accommodate the type species, *Psallus piceicola* Knight, *P. flaviclavus* (Knight), and *P. rubrofemoratus* (Knight). Two additional species, described below, are now known to occur in western North America.

**Biology.** Breeds on conifers, including species of *Abies*, *Picea*, *Pinus*, and *Pseudotsuga*.

#### KEY TO SPECIES OF *PSALLOVIUS*

1. Length of antennal segment 2 less than width of head across eyes . . . . . 2
- Length of antennal segment 2 usually greater than width of head across eyes; sometimes equal to width . . . . . 3



Fig. 16. Dorsal habitus photographs of male *Psallovius* spp. A. *P. dimorphicus* Schwartz and Schuh. B. *P. nigroantennatus* Schwartz and Schuh.

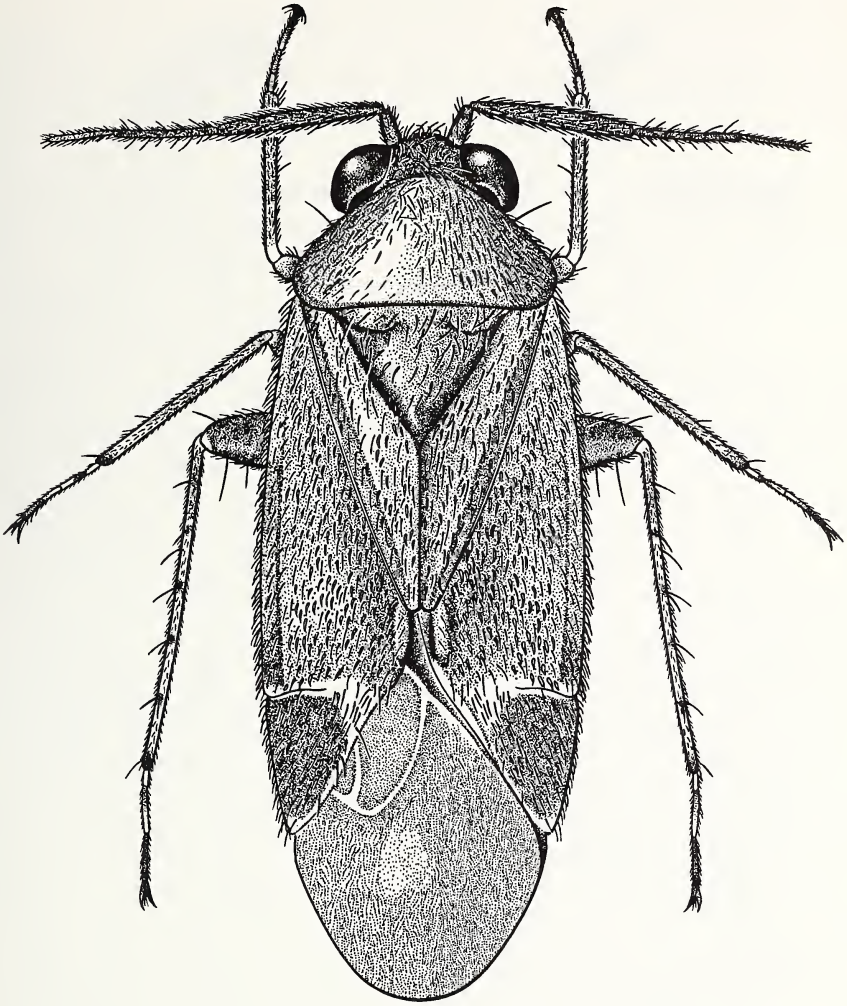
2. Antennal segment 1 and 2 black; base of cuneus narrowly pale or translucent; hemelytra always uniformly dark . . . . . *nigroantennatus*, n.sp.
- Antennal segment 1 and 2 pale; base of cuneus broadly pale or translucent; hemelytra sometimes paler mesially on clavus and corium . . . . . *flaviclavus* (Knight)
3. Body length of male greater than 3.50 mm; antennal segment 2 long, 0.78–0.90 mm, ratio of segment 2 to width of head across eyes from 1.20–1.30: 1 . . . *dimorphicus*, n.sp.
- Body length of male less than or equal to 3.20 mm; antennal segment 2 long, 0.58–0.76 mm, antennal segment 2 shorter, ratio of segment 2 to width of head across eyes from 1.00–1.18: 1 . . . . . 4
4. Femora, except for pale apices, bright red . . . . . *rubrofemoratus* (Knight)
- All femora, except for pale apices, dark brown to black . . . . . *piceicola* (Knight)

***Psallovius dimorphicus*, new species**

Figs. 16A, 18A

**Diagnosis.** Distinguished by the great sexual dimorphism of hemelytra, cuneus, and membrane; the long antennal segment 2; the relatively wide head; the dark brown dorsum with slightly paler corium; and the long apex of the vesica adjacent to the secondary gonopore of the vesica.

**Description.** Male (Fig. 16A). Elongate, parallel-sided, total length 3.7 (3.2–4.0) mm, dorsum including cuneus dark brown, with apices of emboliar margin, corium, and cuneus and crescent-shaped base of cuneus pale; vestiture with silky, silvery white scale-like setae and shining, brown simple setae. **Head:** dark brown, relatively narrow; width 0.67 (0.65–0.70); vertex width 0.28 (0.26–0.30); eyes large, antennal



0.1mm

Fig. 17. Dorsal habitus illustration of *Psallovius nigroantennatus* Schwartz and Schuh.

socket contiguous with and dorsal to ventral margin of eye; antenna pale yellow, segments 3 and 4 brown; sometimes segments 1 and 2 dusky yellow basally; segment 2 linear; antennal measurements 0.25 (0.23–0.28): 0.82 (0.78–0.90): 0.50 (0.38–0.56): 0.29 (0.25–0.33); labium pale to dusky yellow, segment 1 and 4 usually dark brown, reaching or slightly exceeding hind coxa, rostral length 1.27 (1.21–1.35).

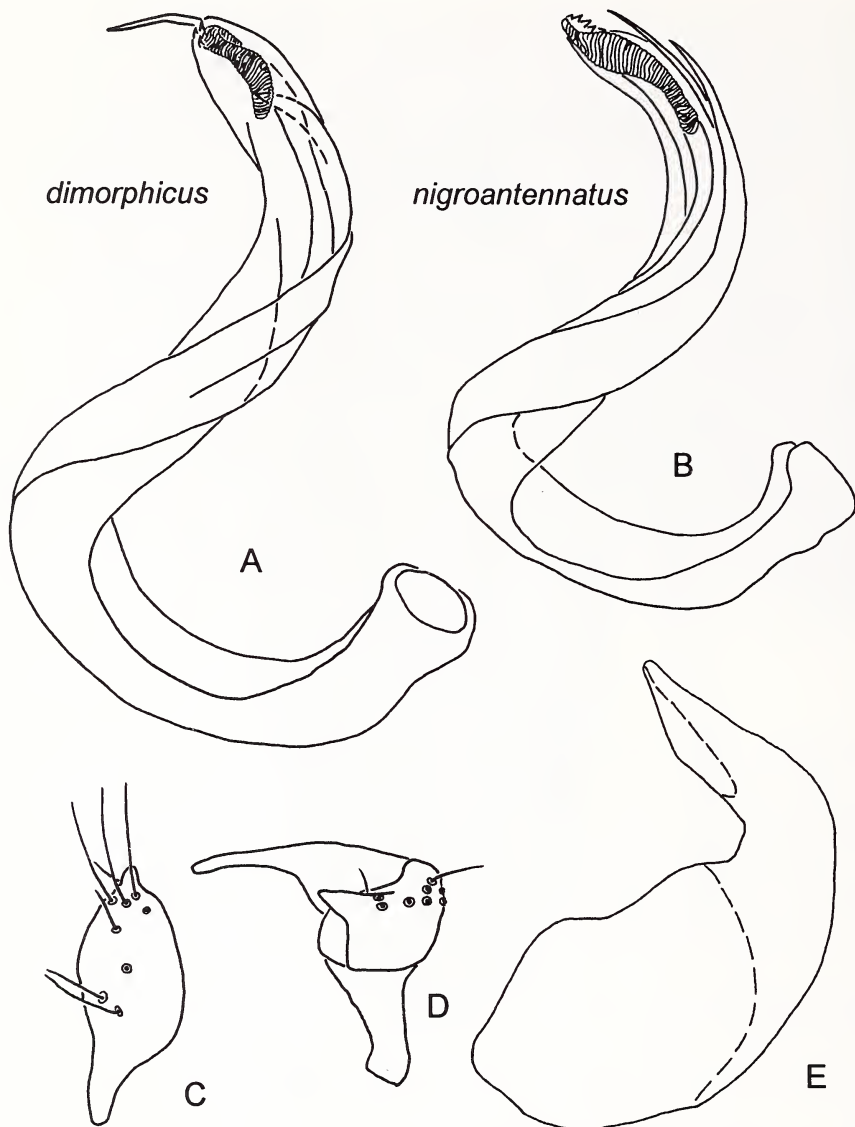


Fig. 18. Male genitalia of *Psallovius* spp. A. *P. dimorphicus* Schwartz and Schuh, vesica. B-E. *P. nigroantennatus* Schwartz and Schuh. B. Vesica. C. Right paramere. D. Left paramere. E. Phallosome.

*Thorax*: mesoscutum, and scutellum dark brown, peritremal disk brown except anterior lobe pale. *Hemelytra*: dark brown, base and apex of cuneus pale; membrane infuscate with large pale areas, veins pale, small areole with red veins. *Venter*: black. *Legs*: black, extreme apex of femora pale; tibia pale to dusky yellow, sometimes

base darkened, tibial spines black with obscure dark spots at bases. *Genitalia*: see Fig. 18A.

*Female*. Hemelytra shorter, otherwise similar to male except: total length 3.0 (2.9–3.2); head width 0.65 (0.63–0.68); vertex width 0.33 (0.31–0.33); antennal measurements 0.24 (0.23–0.25): 0.68 (0.64–0.73): 0.50 (0.43–0.53): 0.31 (0.28–0.33); labium 1.28 (1.25–1.34).

**Etymology**. Named for sexual dimorphism of the corium and antennal segment 2.

**Hosts**. Collected on *Abies* spp. (*A. concolor*, *A. lasiocarpa*), *Picea* (Engelmann spruce, *P. engelmanni* Parry ex Engelm., blue spruce, *P. pungens* Engelm.), and *Pinus contorta*.

**Distribution**. Montane areas in central Idaho and Montana south through Colorado and Utah to Arizona and New Mexico.

**Discussion**. The longer hemelytra, antennal segment 2, and genital segment, the usually wider vertex, head, and pronotum, the apex of the vesica greatly exceeding the secondary gonopore, and the western montane distribution will distinguish *Psallolovius dimorphicus* from the more widely distributed species, *P. piceicola* (Knight).

**Holotype**. ♂, “USA, Utah, Uintah Co., Kane Hollow on Red Cloud Loop, T1S R21E, el 8,500 ft, Sept. 7, 1982, coll. M.D. Schwartz; ex *Picea engelmanni*.” Deposited in the American Museum of Natural History, New York.

**Paratypes**. USA, **Arizona**: *Apache Co.*: Eagar, Apache Nat. For., 12.vii.1967, L.A. Kelton, ex *Picea* sp., 5♂, 6♀ (CNC); 9 mi N of Hwy 260 on FR 117, 19.ix.1998, J.C. Schaffner, 1♂, 4♀ (TAM). *Cochise Co.*, Trail to Rustler Park to Fly Peak, Chiricahua Mtns 31.viii.1976, J.D. Pinto, 4♂, 6♀ (UCR). *Coconino Co.*, Humphreys Peak, Flagstaff, 16.viii.1967, L.A. Kelton, ex *A. concolor*, 13♂, 13♀ (CNC). *Greenlee Co.*: FR 25, 0.5 mi NW of Hwy 191, 33°35'13"N 109°21'49"W, 9,160 ft, 19.viii.1998, J.C. Schaffner, 20♂, 32♀ (TAM); 2.7 mi NE of Hannagan Meadow, 33°38'59"N 109°16'58"W, 8,630 ft, 19.viii.1998, J.C. Schaffner, 1♂, 2♀ (TAM). **Colorado**: *Boulder Co.*: Nederland, 31.viii.1972, L.A. Kelton, ex *Pinus* sp., 1♀ (CNC); Ward, Roosevelt Nat. For., 30.vii.1968, L.A. Kelton, ex white pine, 1♂ (CNC). *Chaffee Co.*: Cottonwood Pass, 1.ix.1980, 12,125 ft, J.T. Polhemus, 1♂, 1♀ (JTPC); Poncha Springs, 28.viii.1968, L.A. Kelton, ex *P. edulis*, 2♂, 3♀ (CNC). *Clear Creek Co.*: Green Lake, Guanella Pass, 6.ix.1982, 9,900 ft, D.A. and J.T. Polhemus, 1♂, 3♀ (JTPC); Idaho Springs, 30.vii.1968, L.A. Kelton, ex *Picea* sp., 1♂ (CNC). *Gilpin Co.*: East Portal, Roosevelt Nat. For., 31.viii.1972, L.A. Kelton, ex *Picea* sp., 2♂, 1♀ (CNC); Rollinsville, Roosevelt Nat. For., 2.ix.1972, L.A. Kelton, ex *Pinus flexilis*, 1♂ (CNC). *Grand Co.*: Fraser, 5.3 mi S of, on Hwy 40, 17.viii.1980, G.M. Stonedahl, ex *A. lasiocarpa*, 5♂, 5♀ (AMNH); St. Louis Cmpgrd, 3.4 mi W of Fraser, 16.viii.1980, G.M. Stonedahl, ex *P. contorta*, 1♂, 4♀ (AMNH). *Gunnison Co.*, Lost Lake, Gunnison Nat. For. 27.viii.1968, 9,500 ft, L.A. Kelton, *Picea* sp., 4♂, 6♀ (CNC). *Jefferson Co.*, Buffalo Crk, 5 mi W of, 5.ix.1982, D.A. and J.T. Polhemus, ex *P. pungens*, 1♂ 1♂ (JTPC). *Larimer Co.*: Fall River Rd, Rocky Mtn Nat. Park, 16.viii.1968, 9,500 ft, L.A. Kelton, 3♂, 2♀ (CNC); Pingree Park, 3.ix.1972, L.A. Kelton, ex *Juniperus* sp., 1♂, 1♀ (CNC); Poudre Cyn, Mtn Park, 5.ix.1972, L.A. Kelton, ex *Picea* sp., 1♀ (CNC). *Las Animas Co.*: Cucharas Pass: 1 mi S of, 28.viii.1982, 9,000 ft, D.A. and J.T. Polhemus, *Picea* sp., 7♂, 5♀ (JTPC); Summit: side of, on Rt 12, 19.viii.1986, R.T. Schuh and J.T. Polhemus, ex *A. concolor* (AMNH): 9,200 ft, 4♂, 7♀; 9,900 ft, 6♂, 14♀; 9,300 ft, ex *Pinus aristata*,

1♂, 7♀. Monument Park, 28.viii.1982, 8,650 ft, D.A. and J.T. Polhemus, 2♂, 1♀ (JTPC); Stonewall, 18.viii.1986, R.T. Schuh (AMNH): ex *P. edulis*: 5 mi E of, 7,000 ft, 1♀; Fire Department, 1 mi E of town, 7,400 ft, 1♀ (AMNH). Purgatoire Cmpgrd Rd, 1 mi N of Stonewall, 8,400 ft, D.A. and J.T. Polhemus, ex *A. concolor*, 3♂, 8♀. *Montrose Co.*: Nucla, 27 mi E of, 9,200 ft, T.J. Henry, ex *Picea engelmanni*, 8♂, 1♀ (USNM); Silesca Ranger Station, Uncompahgre Plateau, 14.viii.1987, 9,000 ft, D.A. and J.T. Polhemus, 1♂, 2♀ (JTPC). *Park Co.*: Geneva Park, 6.ix.1982, 9,600 ft, D.A. and J.T. Polhemus, ex *P. flexilis*, 1♂, 6♀ (JTPC); Trout Crk Pass, Pike Nat. For., 28.viii.1968, L.A. Kelton, ex *P. aristata*, 2♂ (CNC). *Pitkin Co.*: Aspen, White River Nat. For., 24.viii.1968, L.A. Kelton, ex *Picea* sp., 1♀ (CNC); Avalanche, White River Nat. For., 23.viii.1968, L.A. Kelton, 1♂, 3♀ (CNC). *Rio Blanco Co.*, South Fork Cmpgrd, 12 mi S of Buford, 6.viii.1978, J.T. Polhemus, 5♂, 11♀ (JTPC). *Saguache Co.*: 1 mi E of North Pass, 19.viii.1969, J.C. Schaffner, 5♂, 1♀ (TAM); 17 mi S of US 50 on Colo. 114, 31.viii.1980, D.A. and J.T. Polhemus, 1♂, 8♀ (JTPC). *San Juan Co.*, Coal Bank Hill Summit, 1.8 mi N of, on Rt 550, San Juan Nat. For., 15.viii.1986, R.T. Schuh, 10,500 ft, ex *Pinus contorta*, 4♂, 1♀ (AMNH). *Summit Co.*, Dillon, 29.viii.1972, L.A. Kelton, ex *Picea* sp., 8♂, 25♀ (CNC). **Montana**: *Gallatin Co.*, Targhee Pass, Rt 191, 10.viii.1986, 7,002 ft, Schuh, Schwartz, Stonedahl, ex *A. lasiocarpa*, 15♂, 21♀ (AMNH). **New Mexico**: *Los Alamos Co.*, Los Alamos, 15 mi W of, 23.viii.1972, L.A. Kelton, ex *Picea* sp., 2♂, 6♀ (CNC). *Otero Co.*: Cloudcroft: 23.viii.1967, L.A. Kelton, 1♂ (CNC); 7 mi N of, 13.viii.1982, J.C. Schaffner, ex *P. pungens*, 7♂, 9♀ (TAM). **Utah**: *Carbon Co.*: Old Folks Flat Cmpgrd on Rt 31, 14 mi NW of Huntington, T16S R7E, 8,000 ft, 8.viii.1981, M.D. Schwartz, ex *P. engelmanni*, 25♂, 54♀ (AMNH). *Summit Co.*, Kamas, 20.2 mi E of, on Rt 150, 19.viii.1986, G.M. Stonedahl, ex *A. lasiocarpa*, *Pinus contorta*, 2♂, 1♀ (AMNH). *Duchesne Co.*, Avintaquin Cmpgrd, 0.5 mi S of, on Rt 33, T11S R10E, 9.viii.1986, 9,000 ft, M.D. Schwartz, ex *Picea engelmanni*, 2♂, 4♀ (AMNH); Grandview Trailhead, Ashley Nat. For., Unita Mts, T3S R8W, Secs 17 & 19, 9,400 ft, 16.viii.1986, M.D. Schwartz and G.M. Stonedahl, ex *A. lasiocarpa*, 4♂, 7♀ (AMNH); Hades Cmpgrd Ashley Nat. For., Unita Mts, T3S R8W, Secs 17 & 19, 17.viii.1986, 7,400 ft, M.D. Schwartz and G.M. Stonedahl, ex *P. pungens*, 35♂, 79♀ (AMNH). *Sanpete Co.*, Fairview, 13 mi E of, on Rt 31, T14S R6E, 7,500 ft, 8.viii.1981, M.D. Schwartz, ex *A. lasiocarpa*, 2♂, 2♀ (AMNH). *Salt Lake Co.*, Snowbird Ski Resort, Little Cottonwood Cyn, Wasatch Mts. 19.ix.1986, 8,000 ft, M.D. Schwartz, ex *A. lasiocarpa*, *P. engelmanni*, 20♂, 44♀ (AMNH). *Uintah Co.*: same as holotype, 4♂, 5♀; Little Brush Crk nr, mp 22 on Rt 44, T1N R22E, Uinta Mtns, 8,620 ft, 2.viii.1981, M.D. Schwartz, ex *Pinus contorta*, 1♂ (AMNH). *Wasatch Co.*, Lodgepole Cmpgrd nr Daniel Pass, UT40, T6S R6E, 7,800 ft, M.D. Schwartz, ex *Picea engelmanni* (AMNH): 2.ix.1981, 10♂, 52♀; 14.ix.1982, 21♂, 18♀.

*Psallovirus flaviclavus* (Knight)

*Psallus flaviclavus* Knight, 1930: 130 (n. sp.)

*Psallovirus flaviclavus*: Henry, 1999: 108 (n. comb.)

**Diagnosis.** This species is similar to *P. nigroantennatus* in length of antennal seg-

ment 2, which is shorter than the width of head across the eyes, but can be distinguished by the pale antenna.

**Discussion.** Previously only known from Estes Park, Colorado, the locality of the type series. The following new records provide new host associations (Mexican white pine, *Pinus strobiformis* Engelm. and *P. edulis*) and extend the distribution to southern Arizona.

**Material examined.** USA, **Arizona:** *Greenlee Co.:* FR 25, 0.5 mi NW of Hwy 191, 33°35'13"N 109°21'49"W, 9,160 ft, 19.viii.1998, J.C. Schaffner (TAM). *Pima Co.,* Santa Catalina Mts., Mt. Lemmon Radar Station, 9,000 ft, 29.ix.1988, M.D. Schwartz, ex *P. strobiformis* (AMNH). **Colorado:** *Larimer Co.,* 1 mi S of Poudre R on Pingree Park Rd, 37 mi W of Fort Collins, 6,900 ft, 14.vii.1986, R.T. Schuh, J.T. Polhemus, ex *Cercocarpus montanus* (AMNH). *Las Animas Co.:* Stonewall, 8,000 ft, 28.viii.1982, D.A. and J.T. Polhemus (JTPC); 1 mi N of Stonewall on Purgatoire Cmpgrd Rd, 8,400 ft, 18.viii.1986, R.T. Schuh, ex *P. ponderosa* (AMNH). *Montrose Co.,* Montrose, 13 mi SW of, 7,700 ft, T.J. Henry, ex *P. edulis* (USNM).

### ***Psallovius nigroantennatus*, new species**

Figs. 16B, 17, 18B–E

**Diagnosis.** Distinguished by the black antenna, the second antennal segment much shorter than the width of the head across the eyes, the uniformly reddish brown to dark brown dorsum with the concolorous cuneal base, only extreme apex of emboliar margin and apex of the cuneus pale (Fig. 17), and the relatively large secondary gonopore of the vesica (Fig. 18B).

**Description.** Male (Figs. 16B, 17). Subparallel-sided, total length 2.9 (2.6–3.1), dorsum including cuneus brown, only cuneal base with thin translucent mark; extreme apices of emboliar margin and cuneus pale; vestiture with silky, silvery white scale-like setae and shining, brown simple setae; antenna and rostrum black; tibia dusky yellow. **Head:** including vertex brown to black, relatively wide; antocular region and clypeus slightly produced; width 0.64 (0.60–0.65); vertex width 0.25 (0.24–0.26); eyes large, height of eye four-fifths of head height in lateral view; antennal socket level dorsal to ventral margin of eye, and slightly removed from anteroventral margin of eye; antennae dark brown to black; second antennal segment thickened distally; first segment short, exceeding apex of clypeus by one-quarter; antennal measurements 0.20 (0.19–0.21): 0.58 (0.54–0.60): 0.38 (0.35–0.40): 0.27 (0.23–0.29); rostrum dark brown, reaching apex of hind coxa, rostral length 1.13 (1.10–1.15). **Thorax:** mesoscutum, and scutellum dark brown, peritremal disk brown except anterior lobe pale. **Hemelytra:** black, base and apex of cuneus pale; membrane with obscure infusate areas, veins mostly pale, small areole with reddish brown veins. **Venter:** black. **Legs:** black, extreme apex of femora pale; tibia dusky yellowish brown, tibial spines black with black spots at bases. **Genitalia:** see Figs. 18B–E.

**Female.** Similar to male except: total length 2.5 (2.2–2.8); head width 0.64 (0.60–0.68); vertex width 0.31 (0.29–0.33); antennal measurements 0.20 (0.19–0.21): 0.49 (0.43–0.54): 0.36 (0.33–0.40): 0.29 (0.27–0.31); labium 1.13 (1.10–1.20).

**Etymology.** Named for the black antennae.

**Discussion.** Most similar to *P. flaviclavus* in size, distribution, and host preference, but is easily distinguished by the features mentioned in the diagnosis.



**Hosts.** Taken on yellow pine, *P. ponderosa*. In British Columbia also collected on Douglas fir, *Pseudotsuga menziesii* (Mirb.) Franco.

**Distribution.** Southern Okanagan Valley of British Columbia, south to Colorado, the Black Hills of South Dakota, and the northern Sierra Nevada Mountains of California.

**Holotype.** ♂, "USA, Colorado, Jefferson Co., Indian Hills, Falcon Pk., 7,200 feet August 21, 1986, coll: R.T. Schuh and J.T. Polhemus; ex *Pinus ponderosa* Laws. (Pinaceae)." Deposited in the American Museum of Natural History, New York.

**Paratypes.** CANADA, **British Columbia:** Geology Camp, 23.vii.1990, S.G. Cannings, ex mercury vapor lamp, 1♂, 1♀ (UBC); Hedley, 22.vii.1970, L.A. Kelton, ex douglas fir, 1♀ (CNC); Penitcton, 22.viii.1987, S.G. Cannings, 1♂ (UBC). USA, **Arizona:** Apache Co., 4.8 mi S of Hwy 60 on FR 117, 34°11'06"N 109°32'29"W, 7,930 ft, 19.viii.1998, J.C. Schaffner, 2♂, 1♀ (TAM). Pima Co., Mount Lemmon Santa Catalina Mtns 3.viii.1967, L.A. Kelton, ex *Pinus ponderosa*, 2♂, 1♀ (CNC). Cochise Co., Portal, 29.vii.1967, L.A. Kelton, ex *P. ponderosa*, 1♂, 1♀ (CNC). **California:** Plumas Co., Johnsville, 2.ix.1987, H. Pini, ex light trap, 2♂ (CAFA). **Colorado:** Las Animas Co., Cucharas Pass, 1 mi S of, 9,000 ft, 29.viii.1982, D.A. and J.T. Polhemus, 1♂ (JTPC). Jefferson Co.: Deer Crk Cyn, 6.viii.1987, D.A. and J.T. Polhemus, ex *Pseudotsuga menziesii*, 1♂, 2♀ (JTPC). Indian Hills: 12.viii.1986, D.A. Polhemus, 7,300 ft, ex *Pinus ponderosa*, 7♂, 13♀ (JTPC); same as holotype, 9♂, 12♀ (AMNH); 7,300 ft, 6.viii.1987, T.J. Henry, ex *P. ponderosa*, 4♂, 4♀ (USNM). El Paso Co., Monument, 9.viii.1977, 6,961 ft, J.T. Polhemus, 1♂ (JTPC). Larimer Co., Mtn Park Cmpgrd Roosevelt Nat. For., 8.viii.1968, 6,600 ft, L.A. Kelton, 3♀ (CNC). Douglas Co.: Perry Park, CL873, J.T. and D.A. Polhemus (JTPC): 27.vii.1977, 1♂, 1♀; 30.vii.1977, 1♀ (JTPC). Las Animas Co.: Stonewall: 28.viii.1982, J.T. and D.A. Polhemus, 2♂, 5♀ (JTPC); 3 mi N of, 8,100 ft, 18.viii.1986, R.T. Schuh and J.T. Polhemus, ex *P. ponderosa*, 3♂, 4♀ (AMNH). **Oregon:** Umatilla Co., 19 mi SE of Pendleton, Deadmans Pt. Rest Area on I-80 N, 20.viii.1979, M.D. Schwartz, ex *P. ponderosa*, 1♂, 1♀ (AMNH). **South Dakota:** Pennington Co., Pactola Lake, Black Hills, 5.viii.1971, L.A. Kelton, ex *P. ponderosa*, 16♂, 16♀ (CNC). **Utah:** Daggett Co., Dutch John, 9 mi S of, 0.2 mi N of jct 44 ♀ 260, T2N R22E, 2.viii.1981, 7,500 ft, M.D. Schwartz, ex *P. ponderosa*, 1♂ (AMNH). **Washington:** Asotin Co., Anatone 2.5 mi S of, 2 mi N of Rattlesnake Summit 4.viii.1986, 3,900 ft, Schuh, Schwartz, Stonedahl, ex *P. ponderosa*, 1♂, 6♀ (AMNH).

#### ACKNOWLEDGMENTS

We thank the following individuals and institutions for providing material for this study. Institutional abbreviations are presented in the following list:

- American Museum of Natural History, New York (AMNH)
- California Academy of Sciences, San Francisco, Paul Arnaud, Jr., Norman Penny (CAS)
- California Department of Food and Agriculture, Sacramento, Alan Hardy (CAFA)
- Canadian National Collection of Insects, Agriculture Canada, Ottawa (CNC)
- John T. Polhemus Collection, Englewood, Colorado (JTPC)
- Oregon State University, Corvallis, John D. Lattin (OSU)
- Pennsylvania Department of Agriculture, Harrisburg, Karl Valley (PDA)

United States National Museum of Natural History, Washington, D.C., Thomas J. Henry, Richard C. Froeschner (USNM)  
University of British Columbia, Vancouver, G.G.E. Scudder, Karen M. Needham (UBC)  
University of California, Berkeley, John Chemsak (UCB)  
University of California, Riverside, Saul Frommer, John D. Pinto (UCR)

Field work and initial assembly and sorting of collections were supported by NSF grants DEB-8113481 and BSR-8516635 to Randall T. Schuh. Support for Michael D. Schwartz was funded by grants to G.G.E. Scudder (UBC) from the Natural Sciences and Engineering Research Council of Canada and Forestry Renewal British Columbia. Digitized habitus illustrations were prepared by Christine Johnson of the American Museum of Natural History. Dorsal habitus illustrations were made by David Moorhouse, Agriculture and Agri-Food Canada, Ottawa.

#### LITERATURE CITED

- Fernald, M. L. 1950. Gray's Manual of Botany, 8th edition. American Book Co., New York, 1632 pp.
- Henry, T. J. 1999. The spider-commensal plant bug genus *Ranzovius* (Heteroptera: Miridae: Phylinae) revisited: Three new species and a revised key, with the description of a new sister genus and phylogenetic analysis. *Acta Soc. Zool. Bohemicae* 63:93–115.
- Henry, T. J. and A. G. Wheeler, Jr. 1988. Family Miridae Hahn, 1833. The plant bugs. Pp. 251–507 in T. J. Henry and R. C. Froeschner (eds.), *Catalog of the Heteroptera, or True Bugs, of Canada and the Continental United States*. E.J. Brill, Leiden, 958 pp.
- Kelton, L. A. 1972. Species of *Dichrooscytus* found in Canada, with descriptions of four new species (Heteroptera: Miridae). *Can. Entomol.* 104:1033–1049.
- Kelton, L. A. 1977. Species of the genus *Pinalitus* Kelton found in North America (Heteroptera: Miridae). *Can. Entomol.* 109:1529–1554.
- Kelton, L. A. and H. H. Knight. 1970. Revision of the genus *Platylygus*, with descriptions of 26 new species (Hemiptera: Miridae). *Can. Entomol.* 103:1429–1460.
- Kerzhner, I. M. 1997. Notes on taxonomy and nomenclature of Palearctic Miridae (Heteroptera). *Zoosyst. Ross.* 5:245–248.
- Knight, H. H. 1927. Descriptions of twelve new species of Miridae from the District of Columbia and vicinity (Hemiptera). *Proc. Biol. Soc. Washington* 40:9–18.
- Knight, H. H. 1964. *Phymatopsallus* new genus, and new species of Phylinae from North America (Hemiptera, Miridae). *Ia. St. J. Sci.* 38:127–152.
- Munz, P. A. and D. D. Keck. 1970. *A California Flora*. Univ. Calif., Berkeley, 1681 pp.
- Polhemus, D. A. 1994. An annotated checklist of the plant bugs of Colorado (Heteroptera: Miridae). *Pan.-Pac. Entomol.* 70:122–147.
- Stonedahl, G. M. 1990. Revision and cladistic analysis of the Holarctic genus *Atractotomus* Fieber (Heteroptera: Miridae: Phylinae). *Bull. Am. Mus. Nat. Hist.* 198:88 pp.
- Stonedahl G. M. and M. D. Schwartz. 1996. Two new genera for pine-inhabiting species of Phylini in North America (Heteroptera: Miridae: Phylinae). *Am. Mus. Novitates* No. 3166:15 pp.
- Wheeler, A. G., Jr., T. J. Henry and T. L. Mason, Jr. 1983. An annotated list of the Miridae of West Virginia (Hemiptera-Heteroptera). *Trans. Am. Entomol. Soc.* 109:127–159.